THE MEDICAL JOURNAL OF AUSTRALIA

VOL. II.—20TH YEAR. SYDNEY, SATURDAY, OCTOBER 14, 1933. No. 16.

Table of Contents

The Jackson Lecture.[1]

SOME MEDICAL ASPECTS OF RACIAL RESISTANCE.

By R. W. CILENTO, M.D., B.S., D.T.M. & H.,
Brisbane, Queensland.

THE written histories of particular nations are sometimes no more than a record of the crimes and catastrophes that have hindered their progress; and "progress" itself has often been regarded as a term that designates simply "the ambition to conquer". In actual fact, the history of man is the story of his gradual conquest and control of his surroundings; and the ebb and flow of the combat with disease is a specialized part of the story.

In Europe, so short a period as three thousand years will take us back before the dawn of written history; but it will take us back also to the closing stages of other mighty civilizations in Asia and Africa, which themselves had roots in forgotten ages once as vital and progressive in achievement as our own.

Shelley has written the seemingly obvious story of these once vital forces where he says:

> I met a traveller from an antique land
> Who said: Two vast and trunkless legs of stone
> Stand in the desert . . . Near them, on the sand,
> Half sunk, a shattered visage lies, whose frown
> And wrinkled lip and sneer of cold command
> Tell that its sculptor well those passions read
> Which yet survive stamped in those lifeless things;
> And on the pedestal these words appear:
> "MY NAME IS OZYMANDIAS, KING OF KINGS,
> LOOK ON MY WORKS YE MIGHTY,—AND DESPAIR!"
> Nothing besides remains. Round the decay
> Of that colossal wreck, boundless and bare,
> The lone and level sands stretch far away.

But something does remain; though life is short both for man and for his local civilizations, knowledge is imperishable while its records or its practices endure, and the total sum of knowledge

[1] Delivered at Brisbane on September 1, 1933.

slowly but surely increases. The entire face of the inhabited earth, indeed, bears the imprint of man's master hand, black, yellow and white, and his continuous, though laborious, advance is evident as much in the eolith as in the aeroplane.

If individual civilizations grow old and die, as individual men do, civilization itself is like a perennial plant. From time to time, after centuries of that stagnant conservatism that is the winter of progress, its gnarled stock is suddenly mottled anew with the brave green of individuality, is soon adorned with the flower of liberty, and soon runs to seed as licence. But in its own inevitable decline each new blossom of human endeavour scatters vital seeds, from some of which, in near or distant soils, there always arise self-sown civilizations which grow towards a new flowering in their own season.

One outstanding feature of written history is the diminishing isolation of its human units.

The natural barriers that separated early races rigidly from one another, fostered the growth of clans, tribes and nations, but these successively made contact and disputed the "No Man's Land" that had lain between them.

In an isolation of centuries races develop characteristic differences of custom, habit, religion, production and speech, and, too, distinctions of disease endemicity and immunity, quite as local as language. War and trade are the two leaves of the gateway that lead through these natural and artificial barriers; and through them pass the forces that correct, maybe, the disadvantages of isolation, but that disturb also the equilibrium produced by a protective isolation. From time immemorial such racial impacts have shaken the bases of law, power, trade, philosophy and health, until the two contending cultures have found in each respect a common level.

It is possible to distinguish in the State, as in the individual, a double series of conflicts with environment—an "external" series that consists in epidemic invasion from outside, and an "internal" series that from complex origins produces constitutional decay and lessened resistance within.

Several authors have realized that the decline of Greece and the fall of Rome coincided in each case too exactly with the incidence of epidemic plague and endemic malaria to have been unrelated; indeed, that the decay of these civilizations may probably be ascribed far more truly to those inroads upon the vitality of their peoples than to sudden foreign invasion or internecine warfare. But while undoubtedly these were the spectacular diseases that struck them down, it is far more important to recognize the lowering of racial resistance, apart from actual disease, that first brings civilization to its knees.

It is a medico-economic problem, and if in my remarks, therefore, the economic and social history of particular periods seems over-stressed, it is because I claim that the health of the individual is the vital factor in the progress of every civilization, just as his highest welfare is its avowed objective.

The important effects on racial vitality of epidemic disease, of endemic disease, and of the economic factors that lessen resistance and fertility, are seen, albeit very sketchily, in the history of the fall of the Roman Empire, the close of the Middle Ages, and in the rise of Western civilization.

Europe in A.D. 550.

By A.D. 550 Rome had long languished in that disillusion that accompanies decline, civilization was already collapsing and Europe was reentering the darkness of barbarism.

Augustus and his successors had found Rome brick and had left it marble, but the "magnurban" or "megapolitan" policy they pursued had resulted also in an overwhelming urbanization of the people, a universal widening of the franchise of citizenship, which disguised the surrender of all essential liberty, and a persistent sacrifice of the interests of the rural areas to the clamor of the cities.

Why not? The cities had the riches; the riches suborned the army; the army was the mother of emperors.

Though the office of emperor was hereditary, there was no longer an imperial family, and from the period of anarchy that followed the defeat and death of Valerian, supreme power was attainable only by good fortune, by force, by bribery and by skilful intrigue.

The successful aspirants to political power preserved their dominion by pandering to the increasingly foreign masses with hollow titles of equality, extravagantly applauded doles, and promises and spectacular entertainments; while they sought to add dignity to the position they usurped by sumptuous buildings, monuments, amphitheatres, and administrative offices, and even by surrounding the office of emperor with the oriental splendour of formal deification (modified later to become "the divine right of kings"). Nevertheless, amidst this ostentatious opulence, even the best intentioned of them were powerless to control their governors or to check a corruption that became ever more widespread as the people saw with shrewd eyes the handicaps of honesty.

The Romans had always exacted a large amount of money from their subjects, principally by the tax on land and by the tax on industry (*chrysargyron*). Magnificence is costly, and "liberty" and "equality", terms so inspiring in earlier centuries, soon became the pretexts under which, to placate the lowest of the people, their wealthier fellow citizens were taxed for public works, largesses and amusements, until the source ran dry; and, as always in such circumstances, the middle classes rapidly decayed and with them prosperity.

As with the capital, so with the provincial centres. Municipal office as a curial had been the ambition of all better class citizens, but it became first an empty honour, and then (as waves of economic depression arose and became more frequent and more prolonged) a menace, for the curials were responsible in their own persons and estates for the

taxes demanded from their city. Laws were even made that automatically raised to curial status all who owned twenty-five jugera of land, and that retained them in office by force as perpetual "slaves of the State", but in spite of this counsel of despair (or because of it), the community was increasingly unable to support the burden of administration. The middle class artisan and the small landholder were ruined first and eliminated. Many preferred to surrender their lands rather than incur the fatal responsibility of collecting the city precepts for the State treasury, and those who could, fled—fled beyond detection of the stigma of their superior status—or became monks, or soldiers, or officials of the State.

The masses, which had at first heralded with a jealous satisfaction the penal taxation of the middle classes and had applauded the constant expansion of a nominal equality, soon found to their dismay that every social blow falls most heavily upon the lowest classes. Agriculture withered away until whole areas were deserted, and there was no population save in towns; commerce, the life blood of civilization, drained away under the impositions and taxes of rulers desperate for funds; and credit and confidence vanished. Serfdom and slavery increased more rapidly than the ever-increasing scope of citizenship. Indeed, the masses of their own free will restricted their scanty freedom more and more, and, as Finlay points out, they made themselves serfs to their guilds and trade corporations long before their barbarian conquerors extinguished the last vestiges of freedom by extending their serfdom to the soil.

Fifteen centuries before our own era, the Roman bureaucracy believed it could override that law of man's existence that impels him to better his individual destiny, and, indeed, that only by so doing could it stabilize the State in a condition that it was presumed would be one of permanent prosperity. It fixed irrevocably the peculiar sphere of each man's duties and his earnings, and fixed the prices of common commodities, anticipating employment and a sufficiency for the individual, and a mighty surplus for the State. Finally, as a measure of protection against faction or revolt, arms were forbidden to citizens and defence was entrusted to barbarian mercenaries, while public comment was forbidden upon any matter but religion.

The experiment completed the ruin of the Empire.

The peasants deserted the rural areas in such multitudes that even whole provinces fell out of cultivation; in the cities unemployment reached unexampled heights and the unemployable became an ever-increasing moiety. Raw food dwindled in quantity and became ever poorer in quality: only diminishing importations of mouldy wheat from Egypt and mildewed herring from the Baltic eked out the remnant of the home-grown supplies that escaped the official collectors for the army and the State, and that remnant was a modicum "barely adequate to perpetuate the race of tax-payers". The army itself was more and more conscious of its mastery.

Malaria had been introduced from Greece into Italy by the mercenaries of Sulla and Marius, and had assumed serious proportions in many places. Money was not available for the continuance of those social services that were to provide for the individual all and more than he might have acquired by private enterprise, and the aqueducts, the drains and the sewers fell into a disrepair that crept ever closer to the cities. Large areas (some of them persisting to our own day) became uninhabitable malarial swamps or the scenes of the lethargic and spasmodic activity of a chronically infested population.

Malnutrition in the cities was a graver menace.

McCollum and Simmonds have pointed out from their experiments that:

> Animals may be brought into a "twilight zone" of nutritional instability and yet present no external evidence that they are not in the optimum condition . . . . A diet may be sufficiently good to enable an animal to grow in a perfectly normal manner and to exhibit a normal amount of fertility. Yet with each succeeding generation the progeny became smaller and less well developed physically, and after two, three or four generations this strain died out.
>
> Several comparable examples of similar experiences in man may be cited. Campbell (1889) stated that among the poorer classes in the slums of English cities the family never passed beyond the third generation. Galton (1906), in a statistical analysis of one thousand town families and one thousand country families, selected from the town of Coventry and the surrounding rural population, found that the town population supplied to the succeeding generation but three-quarters of the number supplied by a similar number of country people. In two generations the adult grandchildren of the town dwellers amounted to but little more than half the number of the descendants of the country dwellers. The employed urban dwellers are continually being recruited from country stock, and themselves tend to die out.

Many an evidence of physical and mental degeneracy is obvious in the history of Roman times. Physically, we note in passing such items as the fact that from the fourth century the soldiers—then all conscripts—were unable to bear the weight of the heavy Roman breastplate, and the nodding helmet that had been the terror of her enemies, was replaced by a cap.

Mentally, the evidences of decay were legion.

The crumbling of fixed institutions, of justice and of order, had been accompanied by a reversion to crude superstition among the ignorant and by a hysterical mysticism among the better educated. Transcendental foreign theories and philosophies learned from the lips of slaves (whose cheap labour was imported in an endless stream) destroyed alike the moral standards of Rome and that ethical code which had been an integral part of her constitution; and destroyed, too, finally, family, tribal and national feeling.

The growing difficulty of raising troops owning allegiance to Rome or of paying any troops whatever, suggested as an expedient for payment the dangerous grant of Roman land and gave the demagogues ample arguments for pacifism and for a specious advocacy of universal brotherhood and

racial equality. A kind of communal fervour of self-abnegation, half Christian, half Stoic, ran riot on the one hand, and with it a despairing cry for leadership and guidance, while on the other stood the masses, without a future, who had been taught to demand as a natural right "bread and circuses".

Meanwhile human fertility so diminished and morbidity so increased under the twin scourge of malaria and malnutrition that, in spite of massive additions of foreign slaves for public works and labour, the population rapidly decreased. The disillusioned and half-fed provincials of 176 consecutive years looked on with resignation as district after district was invaded and seized by arrogant hordes of savages they had despised; and Italy herself lay at the mercy of her hired soldiers and was ruled without question by their dictators. The pace quickened: phantom emperors were hustled into the purple and out of it by haughty barbarian chiefs, until in A.D. 476 Odoacer (Odovacar) contemptuously struck the sceptre from the delicate hand of Romulus Augustulus, and the Roman Empire of the west ceased to be.

In the century of chaos that followed—during the struggles of Odoacer and Theodorich; of Gothic Arianism against Roman Catholicism; of the East Gothic nation against Justinian; and with Arabian, Jewish, Persian and Egyptian merchants, pandars, slaves and speculators, agitators and philosophers streaming into and about every centre that promised a return—the Roman Empire was a perfect pother of racial contacts, and the Roman people, from the provinces to the capital, an economically oppressed and under-nourished mass without either mental or physical resistance.

Into this ideal pabulum came the bubonic plague of the east in A.D. 549.

This disastrous epidemic was first noticed in the neighbourhood of Pelusium in Egypt, and spread over the whole known world. In the spring of its second year Constantinople was visited by the pestilence, which progressed by leaps and bounds until the deaths reached over five thousand per day. Since all restraints on free traffic and intercourse had long since been raised by private interests or lost by indolence, and since from Persia to France the nations were intimately associated by wars, by immigrations and by trade, the plague spread from the coast to the most inland and sequestered spots. It was not until after a calamitous period of fifty-two years that mankind was free again from its immediate peril, while it smouldered in distant areas for two centuries. One can perhaps admit as reasonable Gibbon's estimate that one hundred million persons died during this epidemic.

Many cities of the east were left totally vacant, while in Gaul, Spain and Italy of the west, much of the soil lay fallow for want of labourers, and harvests and vintages withered on the ground. The frontier provinces were depopulated and in the whole basin of the Danube, from Switzerland to the Balkans, the Roman population so completely disappeared that after the sixth century there were in these countries only Germanic or Slavic invaders; in Belgium, likewise, the Franks found only a desert.

The empire of the west was shattered to fragments—fragments that forgot their original unity in their new isolation. Ignorance and barbaric manners grew apace with the increasing infiltration of Teutonic settlers; men's thoughts and habits and interests were narrowed by lack of contact with culture; and the organization of the Roman provinces and the Germanic tribes dissolved alike into a sordid chaos as the memory of the unity, the sway, the civilization and the symmetry of the fallen empire faded.

From that withered stalk fell two seeds, Roman law and the Roman church, to flourish in their season.

This great plague may be said, indeed, to have destroyed the Roman Empire of the east also, for Constantinople was forced by her weakness to pay an annual tribute of three thousand pieces of gold to the Persians; all the emptied provinces between the Adriatic and the Danube were inundated by Slavic tribes; and government gave place to anarchy.

When the founder of the Byzantine Empire, Leo III, an Isaurian Asiatic and a "heretic", seized the power in A.D. 717, six emperors had been dethroned in twenty-one years; four perished by the hand of the public executioner; one, deprived of sight, died in obscurity; and the last, Theodosius III, ended his days by permission in a monastery. It is curiously apt and arresting that he should have insisted that his tombstone should bear no inscription but the one word "Health"—word of salutation, farewell and warning. It might well be the epitaph of every civilization!

Europe at the Close of the Middle Ages.

The second period of interest to us is that in which the primitive races of north-west Europe grew to their borders in isolation, met the established power of the Moslem world, and were defeated by it, but, in their defeat, laid the foundation on which is built present day civilization.

At the fall of the Roman Empire the balance of power passed again to Asia Minor, the meeting place of east and west, and the home of many an ancient civilization.

Situated at the cross-roads of empire, linking Europe, Asia and Africa—the *entrepôt* of commerce—it has suffered very heavily from epidemic plagues and endemic scourges. Its most recent civilization, the Moslem, ran a correspondingly fevered course: a century or two of power and brilliant conquest, then a century or two of decline, followed by periodic infusions of healthy primitive blood, reinvigorating temporarily a body politic made languid by disease.

This was the history of the Arabs, who in less than a century, between A.D. 637 and 732, carried the crescent triumphantly to Indonesia in the east and to Spain in the west, overrunning the whole of

the southern and western provinces of the Roman Empire. It was the history of the Seljuk Turks, who reinvigorated Islam three hundred years later, and of the Ottoman Turks, who in a further four centuries were to capture Constantinople (1453) and to bring the east into the west as far as the walls of Vienna, the capital of Austria, by 1683 (two hundred and fifty years ago).

When, with the cessation of the great Asiatic migrations, new blood ceased to pour into Asia Minor, the short but brilliant cycles that make up the history of Moslem domination found no further source of vigour to buttress a civilization sapped continually from within. In our own day the former glory of Islam is forgotten and overlaid by the blight it imposed in its decline on Syria, Palestine, Egypt and North Africa.

Nevertheless, as Sir George Newman has shown in such an interesting manner, for several centuries the Moslem world almost monopolized power and learning. Even before the collapse of the Roman Empire of the west the outstanding educational centres of the world had become Edessa in Syria, Bagdad in Mesopotamia, and Gondisapor in Persia. From A.D. 744 to 1236 Mohammedanism was to have its western headquarters at Cordova in Spain, while the eastern caliphate was ruled and enlightened from Bagdad.

Before A.D. 850 Cordova had become an immense city of one million people, three hundred mosques, and two hundred thousand houses, with a vast and renowned library that made it and its graduates the leaders of medical thought for four hundred years.

At this time France, Germany and the British Isles were a loose aggregation of negligible feudal groups where a new race was struggling to maintain a precarious existence in a solitude constantly menaced. The Huns in the fourth and fifth centuries had been followed in the sixth by the Avars, fleeing before the Turks, by the Bulgars in the seventh, and the Magyars in the eighth and ninth. In A.D. 955 western Europe was saved in a critical battle when Otto disastrously defeated the Magyars at Lechfeld, near Augsburg in Austria and drove them back to settle finally in Hungary. In the eleventh and twelfth centuries the Norman-French chivalry, in its isolation, had definitely established itself, and the Mongolian and Turkoman tribesmen found easier entry into Syria and Palestine, whose declining civilization they were to revive. By the end of the eleventh century north-western Europe had spread to its borders and had begun to peer with curiosity across the "No Man's Land" to the south, where lay the menace of the Arab sword and the hardly less dreaded menace of her pagan learning.

A comparison between the old and ornate Arab civilization and the primitive vigour of north-west Europe shows on the one hand a rich, enlightened and well-policed world, and on the other the picture given by Harold Lamb in his book, "The Crusades: Iron Men and Saints". He says:

> The damp forests were there as before, and the grey ruins where owls glided from the vines. The wolves hunted in packs as usual. Only small patches of land were cultivated, in stony ground, near the hamlets. Clay and stone huts, roofed with thatch, clustered below the hewn logs of a lord's hall and a stone tower.
>
> Cow herders slept by the beasts in the outer fields, and sheep crowded the narrow forest trails. Here and there could be seen the white dust and broken stones of a Roman road. Sometimes a Jew passed along the highroad with his pack horse, or a merchant with his guard of spearmen. More rarely the cavalcade of a baron—a master—raised the dust, and the men in the fields thronged around to stare at the powerful chargers and the dark, oiled chain mail, and the fur-edged cloaks.
>
> Few of them ever saw more than this—except perhaps the great cross where the roads met at the end of their valley. What lay beyond the hills was unknown, and hostile . . . .
>
> The men of the dark age often were buried in the valley of their birth without having seen any other.

This isolated Anglo-Saxon and Norman-French population had, nevertheless, reached an equilibrium with its own endemic diseases that permitted progress, but it was a progress where the all-prevailing necessity was that of winning a food supply from a poorly cultivated soil.

Scurvy was so rife that it was as characteristic of England as ergotism (Saint Anthony's fire) was of France and as leprosy was of Normandy; and alongside agricultural uncertainty went a low standard of physique that set the common people well below their lords. A man of good physique was obviously a noble, who had sheep and oxen that could be stalled and fed throughout the winter, and dove-cotes, streams and copses to provide fish and fowl. The poor lived upon a ration (mainly of rye bread) deficient in protein and fat and in actual content, and eked out by occasional additions of salt meat or dried fish. The savage game laws of mediæval England are an interesting commentary.

The monastery exerted a less direct but scarcely a less powerful influence upon the mass of the people than did the manor of the feudal lord; it preserved and taught what knowledge it had of law, of sanitation and hygiene, education, agriculture and estate management. It did what it could for the provision of local health and general convenience by watching water supplies, preventing the fouling of useful streams, and arranging the regular times for the emptying and cleansing of ponds and mill dams. It assisted, too, to lighten labour by supervising on an extensive scale cooperation among the peasants.

In the eleventh century the manor and the monastery were reinforced by the guild (so marked a feature of the revival of economic life in southern Europe), and in this triple "amalgam of social life" grew up the England of the middle ages.

Time does not permit me to describe the sequence of events that led up to the Crusades and made their first effort successful, but the end of the eleventh century, in which they were provoked, was a time singularly opportune for the Crusaders and inopportune for the Moslem.

After the capture of Jerusalem by Omar in A.D. 637, the Arab rulers had been clement and

tolerant and had shown a courteous patronage to the semi-barbaric nations of western Europe. It will be remembered that in 807 Harun al Raschid, as a graceful gesture, had nominally recognized the symbolical lordship of Jerusalem vested in Charlemagne, to whom the Christian patriarch of Jerusalem had in the year 800 sent the keys of the city. But the fanaticism of the caliph Hakim wrecked the increasing trade that had grown up between the east and the city States of Italy at a time when Islam was already failing to hold its European possessions. The Arabs had been pushed out of south Italy in 916, out of Sardinia in 1016, and out of Sicily in 1090. The capture of Jerusalem by the Seljuk Turks in 1071 and the crushing defeat administered to the Byzantine Empire at Manzikert in the same year had, it is true, wrested all Asia Minor from the rule of Constantinople, but the last Seljuk ruler, Malik Shah, died in 1092, leaving the Arabs broken and dispersed into hostile groups.

In 1095, Pope Urban II, himself a Frenchman, struggling for the recognition of the Roman Church and the correction of the abuses that had disfigured Christendom, turned naturally to the Norman-French warriors of his homeland, in the hope that by the recapture of the Holy Sepulchre all Christians might be combined to give the Roman Church unity, dignity and dominion.

It was the hope of the growing city States of Genoa, Venice, Pisa and Florence, on the other hand, that, at the expense and peril of the half-savage Norman-French, they themselves might recapture and extend their former trade in Asia Minor, ruined by the new bigotry of Islam.

While the Crusades were expeditions of Christians organized by the Pope, and every Crusader was an armed pilgrim whose penance had been remitted, it would be foolish to disguise either the semi-barbarous condition of the Crusaders or the great importance of the commercial objective. The pilgrims were gathered in large bodies about the most powerful lords, but they were not subject to any discipline. They remained free to pass over to any other troop, or even to abandon the expedition when they judged their vows had been accomplished. They marched in disorder and slowly, mounted on their big horses, clothed in heavy armour already obsolete, and encumbered with baggage, servants, camp followers and women.

"The Amir of Acre to the Lord of Caesarea, Greeting," runs one Arabic letter. "A race of dogs, stupid and quarrelsome, has passed by me, marching without order. As thou lovest the Faith, do what thou mayest and have others do all that may hurt them. Send this word to other citadels and fortresses."

In the deserts the men (and horses) died of hunger, thirst and fatigue, and in the camp epidemic malaria and dysentery carried them off by thousands. A whole regiment of Germans, fully equipped with armour, landing from its Genoese ships of transport, was wiped out almost on the beach by pestilence, several of its leaders included. During the three centuries of the Crusades more than two million people perished.

The Latin knights and the Italian merchants who had come to make their fortunes and to seize control of commerce, gave the mass of the Crusaders the force of direction, for their enthusiasm and bravery served to render them in effect merely the auxiliaries of these shrewd merchants of the Mediterranean.

At the outset this combination defeated the disunited Arabs and founded a Christian kingdom of the Franks in Syria and Palestine. It persisted for about two hundred years—a long span for those countries.

At its greatest extent the Frankish kingdom ran from Beirut to El Arish, along the coast, with extensions for trade purposes both north and south, to control the routes of the caravans from Damascus to Egypt and to the Red Sea. But this is an area in which malaria is common and endemic, and the Franks maintained themselves longest only where malaria was absent or where ready help was available from the sea.

(It is unnecessary to describe in detail the political and economic aspects that led to ultimate destruction, though, to be sure, the deaths of eleven kings of Jerusalem within a century were of the utmost importance; the commercial concessions granted to the Italian city states were actually so great that they weakened materially the intrinsic resources of the new kingdom; and an intriguing story can be written round the fact that the Frankish women, protected largely from the malaria that slew their outdoor husbands, were the beneficiaries under their wills and continually permitted their power and property to be utilized by rowdy adventurers, newcomers to Palestine, who wrecked well-intentioned and progressive local schemes.)

It is to the endemic malaria, however, that we must ascribe that loss of vigour and fire with which the Syrian-born Franks were reproached, for, as is well known in countries where it is endemic, the outstanding symptom of chronic malaria is mental and physical indolence.

May I draw a modern illustration to demonstrate the forces that defeated the Crusaders?

As Colonel Butler, in his "Official History of the Australian Medical Services, 1914-18", points out, malaria manifests itself most violently in Syria and Palestine from May to December, the peak for benign tertian occurring in July, and the peak for malignant tertian occurring from September to October.

In A.D. 1187, Salah-el-Din (Saladin), inspired to a new holy war, and with chronic malaria as his chief ally, bore down before him the Crusaders. At Hattin a levy of the whole Frankish kingdom, twenty thousand strong, rotten with fever, marching over a sandy plain in the heat of a July sun, was utterly defeated and destroyed, and on October 2, 1187, Jerusalem itself fell.

Mark well the date—October 2, 1187—and turn the pages of history for exactly 731 years. On October 4, 1918, the Australian forces entered Jerusalem, the Turkish and German forces falling back before them, 30% of the Turks with malarial parasites in their blood, without symptoms, and at least 60% of the Germans malaria infected.

And what of the medical history of these new Crusaders in that seven weeks' campaign, as Butler shows it?

During October, 1918, malaria almost rendered the northern and southern forces of the Desert Mounted Corps *hors de combat*, and approximately 48 per cent. of their number came under the care of the Medical Service, in spite of determined, well-organized, and scientifically controlled measures of prevention against malaria.

The striking result of their one period of exposure, and the appalling effect malaria must have had upon their ancestors seven centuries before is demonstrated by the history of the Anzac Mounted Division. The First Light Horse and the New Zealand Mounted Brigade, which spent one night unprotected, lost 315 and 360 men sick respectively before they reached Jerusalem on October 4th; the British West Indians, who spent one whole week unprotected, were practically annihilated as a force, losing 726 sick in four weeks; while the Second Light Horse Brigade, which merely marched straight through the unprotected area into the hills of Moab, had 110 cases.

The least number of malarial cases (many obviously escaping observation or diagnosis) for the short malarial season—May 4th to December 28th, 1918—was 13,237, or 43 per cent. of the whole Desert Mounted Corps, and of these, 6,347, or 22 per cent. of the whole force, and almost 50 per cent. of the total number of cases, arose during the seven weeks of the actual offensive.

If you will take any history of the Crusades and extract from it the deaths of leaders and the crucial victories and defeats between each July and October, further commentary on this phase of racial contact will be unnecessary; unless, perhaps, one adds that in 968-9, under the reign of Kafur, plague in Egypt is said to have killed more than half a million people in and near Cairo; that in 1294 it is reported that seven hundred corpses from plague were carried out of one of the gates of Cairo in a single day; and that in 1412 the Sultan El Muayyed clothed himself in common white wool in mourning for that continual menace to the history of Islam (Sandwith).

The Crusaders had at the outset carried the west into the east and founded on the shores of Asia a Latin and Christian kingdom; they had vastly increased the whole volume of trade, both eastern and western, destroying to their advantage the older economic equilibrium; but in the final expression not only were they defeated, but they brought back the east into the west, and with it the Black Death.

After the destruction of the Christian kingdoms in 1291, the Ottoman Turks crossed into Europe in 1308 and began to settle in the Balkan Peninsula in such alarming numbers that in 1344 a Crusade, manned and financed by the rulers of Venice and Cyprus, together with the Knights Hospitallers, attacked and captured Smyrna, thus again gaining a footing in Asia Minor; but a second expedition sent out in 1345 was a lamentable failure; and in 1346 the black death, which was to destroy between one-third and one-half of the whole population of Europe, entered in its train.

The traders of middle Europe, and even of the Baltic, had for centuries brought a trickle of the produce of the east through Constantinople and up the Danube, but the Crusades changed the route and opened a greater highway for commerce. Trade now passed from Alexandria through Venice, the Brenner Pass, Augsburg and Nuremberg, to Bruges in Flanders, and along this route there sprang into existence these and other great and flourishing towns of the middle ages, imitative of Arab and Byzantine culture.

Thus from Arab civilization there came into mediæval Europe (in some instances for the second time) almost all the inventions which made life easy and agreeable,[1] including, among other things, hemp, flax, buckwheat, asparagus, saffron, rice, maize, coffee, cotton and sugarcane, together with the greater part of its manufactured articles of luxury: linen, damask, morocco, silk stuffs embossed with gold and silver, muslin, gauze, velvet (which was later brought to perfection in Italy), taffeta, crystal and plate glass (imitated in Venice), paper, confectionery, syrups and the use of glass mirrors and face powder. Algebra, trigonometry and chemistry were brought to our forefathers' knowledge, while the Arabic figures, which the Arabs themselves had borrowed from the Hindus, made the most complex calculations easy. The Christians learned, too, from the Arabs, the art of war—the flank attack, the concealment of troops, the feigned retreat, fire weapons, portable siege engines, and, above all, scouting and manœuvring. They learned to mount their archers on horseback, as the Arabs did; to provide them with lighter armour, but armour which included the arm-piece, the thigh-piece, and the breast-piece, and included also helmets that had the adjustable nose-piece of Persian invention, and that introduced to Europe, so we are told, both the movable visor and (though I scarcely dare repeat it) fixed armorial bearings and heraldry, consequently necessary to make identification possible. (Certainly we derive the words "azure" and "gules", the two main colours in heraldry, from Arabic sources.) Finally, from the Moslems there was reintroduced into western Europe the use of orderly systems of taxation!

With these social and economic advantages went, however, the introduction of diseases against which isolated western Europe had no protection, no medicines and no information.

The black death reached England in August, 1348, at ports in Dorset and Devon. It had spread throughout the whole of the ports of Europe, but it fulminated with the greatest violence along the new trade route from Venice to Bruges just described. Not only was it important in the effects of its first

[1] The following words, *inter alia*, indicate the importance of the Arabic influence upon our culture: alcohol, elixir, algebra, alembic, alcove, sofa, amulet, gala, arsenal, admiral, zenith, cipher, zero, alkali, amber, attar, camphor, chemistry, coffee, lemon, musk, myrrh, naphtha, nitre, orange, saffron, senna, syrup, tamarind.

tremendous ravages, but plague domesticated itself for three hundred years, and in London, for example, from 1348 to 1666 there were deaths from it every year, sometimes as many as a thousand in number.

Dreadful as its ravages were—comparable to those diseases introduced during the last century among the peoples of the Pacific, which have in ninety years destroyed 70% of that population—it brought progress in its train. The black death, as Newman points out, was the greatest European example of the influence of disease on the social destiny of nations, for it commenced in earnest the great business of social defence. It introduced industrial legislation with the first Statute of Labourers; it commenced a system of public health administration; and by the bitterest of lessons taught the necessity of effective sanitation, of effective agriculture supplemented by regular food importation, of State intervention in the control of public health, and all the essentials of maritime quarantine.

By A.D. 1550 we reach the close of the middle ages and the swift ascent of western civilization, for these were the events—historical, political, economic and sanitary—that brought it about.

The Dominance of Western Civilization (from A.D. 1550).

What the rising tide of human progress cannot at first flow over, it goes round.

Blocked from the rich east on the land by its defeat in Asia Minor, Europe turned for a new route to the sea, for it had learned navigation from its masters—one of the most curious manifestations of Arab domination was Arab control of the seas from Spain to Canton and Madagascar *viâ* the Red Sea and the Indian Ocean.

The discovery of America by Columbus and his successors and the rounding of Africa by Vasco da Gama gave a new direction to the history of the races fronting the Atlantic. Spain, dominated by the Arabs for hundreds of years, followed them in a maritime supremacy that was unchallenged until the Armada was destroyed in 1588; from 1588 to 1660 the ascendancy was with Holland, formerly a Spanish province under the Emperor Charles V; from 1660 to 1800 England and France shared the seas, with the tendency in favour of England; and from 1800 England was supreme. It was the development of large scale commerce that first made Britain's industrial system possible, and all through the seventeenth and eighteenth centuries she was rapidly and successfully developing her overseas trade and her home markets side by side.

Dr. Sandford Jackson, in the first Jackson Lecture, told you most entertainingly the story of scurvy and its ravages on the long voyages that now, for the first time, became part of English national life. Elsewhere I have mentioned the struggle with those epidemic diseases that reigned triumphant over the fallen greatness of many an Empire in India, Java, Ceylon and other former civilizations—a struggle that was to terminate in the conquest of "climate". Hakluyt and Purchas have provided in their volumes a series of marine histories which must thrill the heart of any Britisher, and though time does not permit me to do more than refer in passing to their medical interest, I should like to quote a few references that indicate the external menaces that met this new civilization pushing its way into the unknown.

The three voyages to the Guinea Coast of Africa from 1553 to 1577 introduce us for the first time to the epidemic malaria of the tropics, and possibly to yellow fever. The fate of the men of the *Primerose* and the *Lion* is set down as follows in the words of their captain:

> In the meane season our men, partly having no rule of themselves, but eating without measure of the fruits of the countery and drinking the wine of the Palme trees that droppeth in the night from the cut of the branches of the same, and in such extreme heate running continually into the water, not used before to such sudden and vehement alterations (then the which nothing is more dangerous) were thereby brought into swellings and agues: insomuch that the latter time of the yeere comming on caused them to die sometimes three & sometimes four or five in a day.

So also Captain John Lok in the second voyage; while in the third voyage, so violently were the men attacked with fever and so many died that the enterprise was abandoned in despair.

No less striking was the story of the Spanish Main and the neighbouring coasts. Robert Thomson's voyage into New Spain in 1555 is particularly interesting in its reference to mosquitoes and (?) screw-worms (*Chrysomyia macellaria* and *Dermatobia cyaniventris*), or possbily chiggers. He says:

> The country is most part of the yere very hot & very ful of a kind of flies or gnats with long bils which do pricke & molest people very much in the night when they are asleepe, in pricking their faces and hands and other parts of their bodies that lie uncovered, and make them to swel wonderfully. Also there is another kind of small worme which creepeth into the soles of mens feet & especially of the black Moores & children which use to go barefoot & maketh their feet to grow as big as a mans head & doth so ake that it would make one run mad.

(This Thomson was badly smitten with malaria a few days after landing on his way to Mexico City from the coast and subjected to repeated severe recurrences which made him an invalid for six months, while four out of the party of eight promptly died.)

The military records in the West Indies, Africa and India make startling comment upon the cost of the struggle for equilibrium between the white men from the cold north and the endemic diseases and disorders of the tropics.

In Jamaica, of the West Indies, it was accepted that the fevers swept away the immigrating population "to the amount of the whole number of its white inhabitants once in five years".

In the African service, Major Tulloch's reports (quoted, like the previous reference, from Johnson and Martin's "Tropical Climates") give as the average death rate for eighteen years in Sierra Leone, 483 men per thousand per year, and add:

Every soldier was thrice under medical treatment and nearly half the force perished anually: indeed, in 1825, and again in 1826, when the mortality was at its height, three-quarters of the whole force were cut off. The Cape Coast Command yielded the same harvest of deaths. Two-thirds of the white troops died annually, and so great was the mortality in 1824 that the deaths nearly equalled the mean strength of the garrison.

As for India, Captain Hamilton is quoted as mentioning that in Calcutta at the beginning of the eighteenth century it is recorded that 460 persons were buried out of 1,200 inhabitants from one August to the ensuing January.

It must not be supposed that these diseases destroyed only Englishmen; they darken also the most glorious pages of Portuguese, Spanish, French and Dutch history, and they had set bounds to the ambition of many an Asiatic conqueror. Speaking of Bengal, for example, a Persian writer states (Gladwin's translations) that it:

was deemed inimical to the constitution of the Moghuls and other foreigners, and only those officers who laboured under the royal displeasure were stationed there; and this fertile soil, which enjoys a perpetual Spring, was considered as a strong prison; a land of spectres; the seat of disease, and the mansion of Death.

But it is unnecessary to labour the story: it is sufficiently well known. The riches of the ancient east were defended by the all-prevailing diseases that reigned supreme above the ruins of her earlier civilizations.

The white man was not only introduced to many new diseases and to old diseases in more virulent forms, but he brought some of the most violent maladies back within his own borders.

Think for a moment what some of these have meant.

Columbus's followers introduced syphilis to Europe from the West Indies, returning in exchange in 1507 the smallpox previously unknown in America.

In England, as Creighton points out, smallpox rose into prominence only in Elizabeth's reign, but by Stuart times it had become a matter of the most serious social importance. In the eighteenth century it reaches its highest point of intensity and distribution throughout all Europe, the mortality in England being one-tenth of the total mortality. Actual figures may carry more weight: it is recorded, for example, that from 1761 to 1796 (that is, just before and just after the discovery of Port Jackson by Captain Cook in 1770 and the first settlement of Sydney in 1788) there were from three thousand to fifteen thousand deaths from smallpox every year in London alone. Jenner restored the balance with vaccination; our indolent assumption of a false security has, maybe, set it swinging again today.

To plague, syphilis and smallpox one must add the striking story of the interracial exchange of dysentery, typhus, cholera, yellow fever, sleeping sickness, leprosy, infantile paralysis, influenza and other disorders, that still continues. Through the dual gateway of commerce and of war they came and come, and if (perhaps taking Sir Leonard Rogers as our guide and cholera as a typical example) we trace the spread of epidemics along the ever-shortening trade routes, we shall be struck not only with the persistent attack of these many diseases, but also with the way in which social experiment and statutory enactment mark the stages of man's counter-offensive.

To those who consider that public health legislation is only a recent and exotic adjunct to our statutory law, it will be difficult to prove that it is in essence the core of social service. Nevertheless its intimate association with every social and industrial problem is obvious, whether it be the first Statute of Labourers introduced nearly 600 years ago by the plague, or the general reticulation of water supplies and the ideal of the "garden city" that cholera brought to England last century.

So much for the factor of external invasion that expanding civilizations must overcome on their march to empire.

But what of internal decay—the negative phase of civilization—that gives successful economic expansion an ambivalent character? What of the law of diminishing returns, if we may apply it to health in the economic sense?

Time, space and perhaps prudence restrict me to generalizations brief enough to be, I fear, obscure. Let me offer a few suggestions and leave consideration of them to you.

The tapping of the great primary resources of the tropics, the introduction of the industrial era, and the increase of available foodstuffs produced an enormous consequential increase in population and living standards—this new Augustan age—but they have produced in a similar sequence problems curiously comparable with those existing in the third, fourth and fifth centuries.

The world has swung heavily out of plumb with the weight of a grossly increased population, and the machinery evolved by man's fertile ingenuity increases the disparity between production and distribution.

Can man deliberately restore the balance (does he ever do so?) or must there be through a century one of those slow but inexorable natural readjustments of which we have evidence in previous history and which so frequently results in an entirely changed social and political pattern?

No thinking person can doubt the fundamental importance of population problems nor their relation to available food supplies, but so complex are the factors involved that the stressing of one or the other may appear to justify any blend of optimism or pessimism about the future. This is strikingly brought out in the opposed view points of the congresses on world population held at Geneva in 1927 and 1931 respectively.

At the 1927 conference, during the boom days, people spoke of Malthus with the kindly patronage of the better-informed; they pointed out that although the population had increased tremendously, such was the equal progress of medical

science and industrial technique that the wealth at the disposal of mankind was equally increased, and a standard of health, of living, of comfort, and even of luxury never (?) before contemplated had become normal.

At the conference of 1931 the present wave of economic depression had reversed opinion and the emphasis was laid, not upon the dangers of overpopulation in western Europe, but upon the prospect of an imminent and appalling depopulation of that home of present day civilization. Dr. Eugen Fischer, demonstrating the pronounced decrease in the average size of families of certain classes in Germany between 1879 and 1910, remarked despondently:

> These few figures clearly indicate the condition of the people—it is that of a moribund community.

Dr. Louis I. Dublin considered it not improbable that the population of the United States of America would reach a maximum of 149,000,000 in 1970 and would then, in the course of the next sixty years, halve itself. Professor Fernand Baudhuin, speaking of the future of France and Belgium, said:

> In any case, the people to which we belong will suffer the consequences of the policy they are now putting into practice. They are probably destined to disappear or to be absorbed by newcomers.

And he drew a graphic picture of a new invasion by Slav races, first the Poles, then the Russians, in the measure that the Latin countries of western Europe became depopulated.

Several speakers gently ridiculed this despondency, pointing out that the elaboration of a simple, reliable and fool-proof contraceptive or the outbreak of a new and uncontrollable epidemic disease or a new virulence in old diseases, such as, say, influenza, selecting particular races or localities, or the discovery of an organism capable of converting worthless cellulose into an assimilable foodstuff—or any one of an enormous number of unforeseen circumstances—"might well stultify the prognostications of all existing authorities on population and hopelessly distort their graphs and curves".

Nevertheless, beyond the incidental fluctuations related to this or that economic depression, we may perhaps discern a curve of greater amplitude which marks the rise and fall of civilizations.

Everywhere, except in Italy, Russia and Japan (among the countries recording their figures) for some time there has been a marked decline in population increase, in spite of massive increases in the growth of cities—perhaps because of these. In this connexion we may recall with a new interest the quotations of McCollum and Simmonds upon the effects of city life, or George Finlay's sweeping introduction to his melancholy Byzantine history:

> It is that portion of mankind only which eats bread raised from the soil by the sweat of its brow that can form the basis of a permanent material existence.

Economists are uncertain whether urbanization is a peril or merely a bogy, perhaps because economics is in the main only a series of theories that have grown up to explain the visible wealth of nations; the man in the street measures civilization merely by the growth of the capital city; the humanitarian by the sentimental standards that protect and preserve the physically, mentally or industrially unfit; but Nature tests civilization by its balance—and not by its bank balance.

Where there is a growing disparity between production and distribution, between numbers and employability, it might be expected that there would follow a loss of mental and physical tone, fertility and racial resistance. Material available to me does not show, as yet, any measurable effects in this regard, but my tendency is to believe that such results occur. Several reliable British workers in Aberdeen recently published the following statement:[1]

> The world crisis, with its dislocation of trade and consequent widespread unemployment, has produced a marked lowering of the standard of living of the working classes. In this country, thanks to unemployment funds and organized relief, no person need approach the stage of starvation. Nevertheless the unemployed man with a family must be dangerously near the lowest economic level at which satisfactory growth and health can be maintained. The problem of the relation of this lowered standard of living to the health of the future generation has assumed the greatest importance . . . . .
>
> If the percentage of anæmic women found in Aberdeen is present in the industrial areas of the south (and we believe that anæmia may be even more severe there, since economic conditions are worse and the cost of living higher), then the loss of economic efficiency of the working class mothers of this country must be enormous. It is true that most of the women investigated complained of few, if any, symptoms of ill health, but this was due to the fact that they had become accustomed to living subnormal lives for years and had really forgotten the joy of good health. They invariably admitted that this was so when, after efficient treatment, their blood level had been restored to normal. It is also certain that anæmic persons are more liable to infection and other forms of illness than persons with a normal blood level, as has been shown by the researches of Helen Mackay . . . . On the grounds of economic efficiency and of health, the prevention of anæmia in working class women and infants has become a major problem and one that demands immediate attention.

As for loss of mental tone, it is suggested in the fact mentioned above that the subnormal is accepted as natural. But it goes further. Both in America and England it has recently been claimed by medical authors that among both the unemployed and that other great section of the public that has been unwillingly obliged to alter the whole course of its life and to lose the bases of what seemed unassailable security, there is a rapid deterioration of morale. It is seen in the development of those tendencies of apathy, despair, self-pity and resentment which represent a menace to the individual and to society itself.

We hear a great deal about the antagonism of the less fortunate towards the government and towards civilization; about the relaxation of standards and of obligations in business contracts, in public morality, in defence, in health; we hear

[1] "Nutrition in Relation to Anæmia", by Davidson, Fullarton, Howie, Croll, Orr and Godden, *The British Medical Journal*, April 22, 1933.

much of "misguided pauperization" and "wholesale imposition"—but any student of psychology will recognize truculence and invalidism as the commonest of responses to an environment of disillusion. It is the psychology of the frustrated.

For some decades there has been a marked lowering of the birth rate, and it is repeatedly asserted (though I have not seen it demonstrated) that preeminently is this the case among the intellectual and better endowed. It is asserted, indeed (again without actual proof), that a rising tide of inferiority is submerging the progressive, as it appears to have done in ancient Greece and Rome. It is something that can be viewed only in retrospect by some future generation.

In the countries of the old world, the lowering of the birth rate, the declining proportion of youth, and with it the declining proportion of potential mothers, actually may all be working towards the correction of the disparity in numbers, production and consumption—a desirable solution, if it does not mean, as it so frequently has, a loss of their frontiers and their culture. But the same decline in birth rate and population increase is as obvious in Australia, and it operates here not towards security, but towards disaster, for we cannot preserve our frontiers unless we can effectively occupy the lands we claim—and we are working against time.

At the white man's coming there were neither enemies nor diseases here, and progress (if we may exclude the incidental scarcity of the first fifty years) has been handicapped neither by famine, by war, nor by pestilence. Our "external" battle, both in health and science, has been fought for us beyond our shores, in the laboratories and factories of the older land.

But though we are, in the present crisis, in the fortunate position of being a primary producing country with great natural resources, we have inherited the handicap of the customs, the usages and the economics of the lands from which we are derived, and that psychology of dependence towards these older countries that I have called elsewhere the "antipodean complex".

Our "internal" problem is complicated not only by such factors, but also by the need of adaptation to living conditions and disease risks widely dissimilar from those of our forefathers; it includes also the problem of the effective settlement of the "fifth part of the world".

What is our actual position in this regard, viewed impersonally?

H. J. Exley, of the Commonwealth Bureau of Census and Statistics, pointed out in the last issue of the *Economic Record* that our present population figures (estimated) indicate with cold mathematical finger an accelerating progress to a population stalemate at an early date—a stalemate at a total population of 8,500,000 people for all Australia. Beyond that we must depend upon immigration, which in its turn depends upon land settlement; in which, again, is there not bound up the whole question of our economic and political security?

For sketchy parallels in economic, geographical and psychological particulars a whimsical Clio might trace the once-ambitious Roman colonies of Mauretania, Numidia, Africa and Cyrenaica; or might recall the instructive history of the Roman colony of Britannia from the third century onwards.

We have grown up in such security that our culture seems as eternal as Cicero, Vergil, Horace and Ovid accepted Rome to be; and we believe as staunchly in its immutability as the fourth and fifth centuries did in the divine permanence of their "Fourth Kingdom".

Perhaps we are right; but supposing we are not?

A philosopher might recall the fact that even Rome, the greatest of empires, was deluded by the glamour of the magnurban theory. She believed that she could protect the rich provinces that were left bare before the eyes of ever-increasing hordes of hungry and primitive peoples as population ebbed, simply by the ancient terror of her name and by mighty walls that flaunted the flag of the empire.

In some places one can see their massive ruins still.

But it is for the philosopher—not the historian—to speculate about the future, and there is nothing that repays speculation so poorly; the issue for yours and mine is already in the hour-glass, and we cannot see which way our sands run.

Only Time can tell—"Time" which, as Colton says:

> is the most subtle, yet the most insatiable of depredators, who, by appearing to take nothing, is permitted to take all. Nor can it be satisfied until it has stolen the world from us, and us from the world. It constantly flies, yet overcomes all things by flight. Time, the cradle of Hope but the grave of Ambition, is the stern corrector of fools, but the salutary counsellor of the wise—bringing all they dread to the one, and all they desire to the other. But, like Cassandra, it warns us with a voice that even the sagest discredit too long, and the silliest believe too long. Wisdom walks before it, Opportunity with it, and Repentance behind it. He that has made Time his friend will have little to fear from his enemies, but he that has made it his enemy will have little to hope from his friends.

Bibliography.

Archer and Kingston: "The Crusades", 1894.
Bryce: "The Holy Roman Empire", Edition of 1904.
Finlay: "The History of the Byzantine Empire", 1854.
Gibbon: "Decline and Fall of the Roman Empire", Edition of 1907.
Hakluyt: "Voyages", 1600—Edition of 1927 (Dent).
Johnson and Martin: "Tropical Climates", Edition of 1841.
Lamb: "The Crusades: Iron Men and Saints", 1930.
Malthus: "An Essay on Population", 1798—Edition of 1914 (Dent).
Newman: "The Rise of Preventive Medicine", 1932.
Nohl: "The Black Death", 1924.
Seignobos: "History of Mediæval Civilisation" (Cole).
Sismondi: "History of the Italian Republics", 1818.

THE ANÆMIAS: MODERN VIEWS.[1]

By Harold Ritchie, M.B., Ch.M. (Sydney),
Honorary Physician, Sydney Hospital.

In my remarks tonight I intend to confine myself to what have been termed the "deficiency" anæmias, or, in other words, those anæmias which are due to defective production or faulty assimilation of certain necessary factors in the production of normal red cells. Time will not permit any consideration of those types arising from injury to the blood-making organs, due to the toxic destruction or the mechanical replacement of marrow. For the same reason any discussion of the heterogeneous group of anæmias caused either by defects of the red blood cells themselves or by their toxic destruction, must also be omitted. However, I trust that some other member of the section will undertake to consider these important and often obscure types of blood dyscrasia in the near future.

Any review, however fragmentary, of recent work on the nature of the anæmias should include a recapitulation of the mechanism of erythrogenesis. According to most observers, the family tree of the adult red cell finds its tap root in the endothelial cell lining the closed intersinusoidal capillaries of red marrow. The direct descendant of the endothelial cell is the megaloblast, from which succeed the early erythroblast, the late erythroblast and the normoblast. These normally all occur within marrow; the later generations of the family tree, namely, the reticulocyte and the mature red blood cell, are found in normal blood (see Figure I). Some hæmatologists claim that the granular leucocytes also derive from the same primitive endothelial cells, and if their contention is right it opens up interesting speculations as to the origin of certain other disorders of the hæmopoietic system, especially the leuchæmias.

In the secondary or hypochromic anæmias we have the familiar blood picture of anisocytosis, poikilocytosis and microcytosis with a low colour index. In the hyperchromic anæmias the blood picture is strikingly different—macrocytosis is invariable, megaloblasts are not unusual, and the colour index is high. The all-important question of macrocytosis and microcytosis I shall leave to Dr. Tebbutt, who has some interesting remarks to make on this subject.[2]

The first ray of light as to the genesis of some of these anæmias was provided by the more or less fortuituous discovery by Minot and Murphy of the curative action of raw liver in so-called primary pernicious anæmia. Encouraged by a painstaking series of experiments by Whipple and Robbins on blood regeneration brought about by raw liver diet in dogs rendered anæmic by bleeding, they administered raw liver to patients suffering from primary pernicious anæmia with the most gratifying results. It soon became evident that raw liver contained a specific principle which produced a complete remission in the hyperchromic anæmias. From this discovery has gradually emerged an hypothesis that each stage of erythrogenesis needs a special maturation factor.

With your permission I shall provisionally divide the types of anæmia under discussion into two broad classes: those with a high colour index, known as hyperchromic, and those with a low colour index, known as hypochromic. In the former macrocytosis, in the latter microcytosis is the rule.

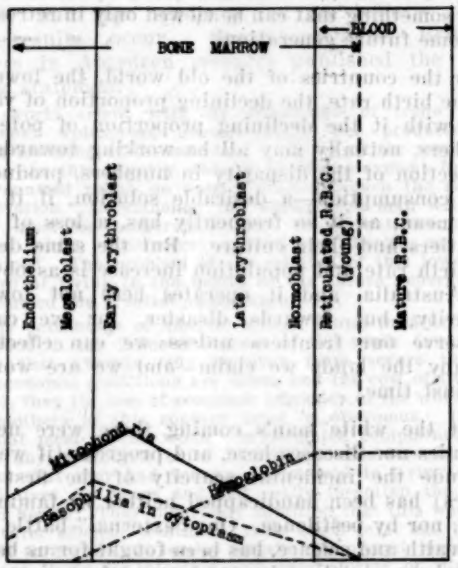

Figure I.
Diagram of maturation of red blood cells (after Sabin).

The hyperchromic anæmias are believed to arise from the absence of or a deficiency in a specific maturation factor which is stored in the liver and is also found in the stomach wall. This substance, which has not been absolutely identified, is probably of a nitrogenous nature and is elaborated in the normal stomach by the interaction of a rennin-like ferment on beef. The series of convincing experiments by Castle and his fellow workers, which demonstrated this, is one of the most fruitful and ingenious researches in modern medicine. Castle showed that the specific ferment which elaborates the anti-anæmic factor necessary to prevent the occurrence of hyperchromic anæmia, is present not only in normal gastric juice, but also in the gastric juice of all patients with hypochromic anæmia; and that beef incubated with the gastric juice of a patient with hypochromic anæmia for one and a half hours will produce a reticulocyte response if administered to a patient with hyperchromic anæmia. He also demonstrated that hydrochloric acid and pepsin alone do not suffice for the production of this anti-anæmic material, which results from the interaction of this hypothetical

[1] Read at a meeting of the New South Wales Branch of the British Medical Association on July 27, 1933.

[2] Dr. Tebbutt's paper has not been made available for publication.—Editor.

ferment in normal gastric juice on certain essential substances found in beef and in yeast preparations. To the ferment, which is thermo-labile, he gave the name "intrinsic factor"; the specific substance in beef, which is thermo-stable, he called the "extrinsic factor". He further proved that gastric juice freed from rennin and pepsin is still effective in producing the anti-anæmic substance and that the intrinsic factor is active in a neutral medium.

Considerable interest has been shown in the relationship of vitamin *B* to the anti-anæmic factor, more especially since Lucy Wills demonstrated that tropical macrocytic anæmia responded satisfactorily to the administration of "Marmite". The evidence as to the utility of this substance in primary pernicious anæmia is conflicting. Strauss and Castle failed to produce any definite results, as did also Davidson. On the other hand, Goodall reports a small series of successful cases after the administration of half an ounce of "Marmite" thrice daily. It is possible that these yeast products contain the extrinsic factor in a concentrated form and that curative results follow only when the stomach is not totally bereft of the intrinsic factor. Furthermore, it seems likely that the active principle is some amino-acid rather than vitamin *B* itself.

Apart from deficiency in the specific anti-anæmic factor, hyperchromic anæmia may arise in certain diseases, due to inability on the part of the intestines to absorb this factor; for example, sprue, certain anæmias due to parasitic infections, especially bothriocephalus anæmias, and in certain grave disorders of the intestinal mechanism. There is also a hyperchromic anæmia of pregnancy due to relative insufficiency of the specific ferment, which disappears when pregnancy is terminated. Similarly, when a large portion of the stomach is removed by operation a hyperchromic anæmia may follow. The following tabulation is adopted from Davidson.

Nutritional Deficiency Anæmias.

(*A*) Due to defective production or faulty assimilation of the specific anti-anæmic material found in liver.
- (1) Primary macrocytic hyperchromic anæmia, that that is, pernicious anæmia.
- (2) Secondary macrocytic hyperchromic anæmia, that is, sprue, bothriocephalus anæmia, cancer of the stomach, multiple anastomoses, gastrectomy, pernicious anæmia of pregnancy (increased demand, that is, relative insufficiency), dysentery *et cetera*.

Note.—Many cases of the diseases in Group (*A*) (2) have a failure in iron assimilation and thus pass into Group (*B*) (2).

The hypochromic anæmias, on the other hand, arise at a later stage of erythrogenesis. They are due to defective absorption and assimilation or reduced intake of the factors necessary for hæmoglobin formation. The chief factor is iron, but there are a number of other necessary factors, including thyroxin and possibly minute amounts of copper. Amongst the anæmias due to this cause is one of particular interest which has been widely described under many names during the last five years. To Witts is due the credit for drawing general attention to this particular disorder, which I have called primary hypochromic anæmia, though it is more commonly known as microcytic anæmia (see the following tabulation).

Nutritional Deficiency Anæmias.

(*B*) Due to defective absorption and assimilation or reduced intake of the factors necessary for hæmoglobin formation.
- (1) Primary microcytic hypochromic anæmia (simple achlorhydric anæmia and the Plummer-Vinson syndrome).
- (2) Secondary microcytic hypochromic anæmia, due to starvation, insufficient or defective dietary, for example, low protein and green vegetable, high carbohydrate diet, milk diet in peptic ulcer, in infants, and in experimental anæmia of rats; inflammation and catarrh of the stomach and intestines [*vide* (*A*) (2)].

The secondary hypochromic anæmias are due to starvation, insufficient or defective dietary, or catarrhal disorders of the stomach and intestines. This category includes the nutritional anæmias of infancy and also the anæmias due to the avitaminoses—beri-beri, pellagra, scurvy and rickets.

Both hyperchromic and hypochromic anæmias are profoundly related to disturbance of gastric secretion. In primary hyperchromic anæmia there is, as a rule, a complete disappearance of normal gastric secretion; in other words, a true *achylia gastrica* is present, except in extremely rare cases, when free hydrochloric acid has been found in small amounts.

In the hypochromic anæmias also achlorhydria is the rule, but this is not absolutely invariable. The amount of pepsin is diminished, but the rennin-like ferment (intrinsic factor of Castle), which is absent in the hyperchromic anæmias, can be demonstrated to be still present. Davies has drawn attention to the fact that there is a deposit of squamous œsophageal cells in the gastric secretion of patients with primary hyperchromic anæmia due to a complete absence of digestive power. In hypochromic anæmias few cells are found, but there is an abundance of mucus.

It appears, then, that all the types of anæmia described may be translated in terms of dysfunction of the stomach and intestines. This explains the curious overlapping in the blood changes which sometimes occurs. A hypochromic anæmia may eventually become hyperchromic as the secretory functions of the stomach gradually fail, whilst the efficient treatment of a hyperchromic anæmia may reveal a hypochromic anæmia which had been masked by the more serious affection. All the secondary hyperchromic anæmias may, for instance, become hypochromic and present the picture of a secondary hypochromic type. There is good evidence for presuming that the type a secondary anæmia will assume depends to a considerable extent upon inherited tendencies, so that, for the sake of example, an anæmia of pregnancy will in one case be hypochromic, in the second and more rare event hyperchromic in character. Similarly, we find either variety of anæmia resulting from sprue or bothriocephalus infestation. I feel sure

you will agree that the hereditary factor in the anæmias is one which it would be impossible to ignore. On two occasions at least I have personally observed the appearance of subacute combined degeneration in children of persons who themselves suffered from primary hyperchromic anæmia after the menopause. This tendency has been well emphasized in the papers of Sinkler and Esher, Patek, Bartlett, Maclachlan and Kline, Witts and Heath, which demonstrate not only the familial factor in the anæmias, but the superimposition of one type of anæmia upon another (see Figures II to VII).

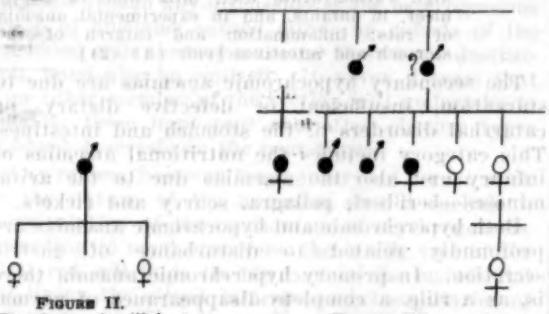

Figure II.
Showing familial factor: Sinkler and Esher (1896).

Figure III.
Showing familial factor: Patek (1911).

The symptom-complex of primary hyperchromic or pernicious anæmia is so well known to you that I shall pass on to a clinical description of primary hypochromic anæmia, many cases of which have in the past gone unrecognized. They have masqueraded under various disguises, ranging from psycho-

Figure IV.
Showing familial factor: Bartlett (1913).

neurosis to occult tuberculosis or hypothyreoidism, dependent upon the diagnostic bias of the physician. Some, indeed, have presented a striking clinical resemblance to primary hyperchromic anæmia and have been known as "pernicious anæmia with low colour index". Others, due to phenomena attributable to the stomach or the pelvic organs, have fallen prey to the operative dexterities of the surgeon or the gynæcologist, but the majority have haunted the out-patient rooms of our hospitals awaiting a long-deferred diagnosis.

The disease is largely confined to women of middle age. The onset of the disorder is extremely gradual. It is sometimes dated from a pregnancy, but as a rule the patient has "felt ill and tired for years". Chief in frequency of symptoms are those due to anæmia: breathlessness, palpitations and choking sensations. Next often occur gastro-intestinal phenomena: anorexia, flatulence and vomiting, constipation or diarrhœa. Some degree of glossitis or stomatitis is frequently present, but it seldom approaches the severity of this symptom in pernicious anæmia.

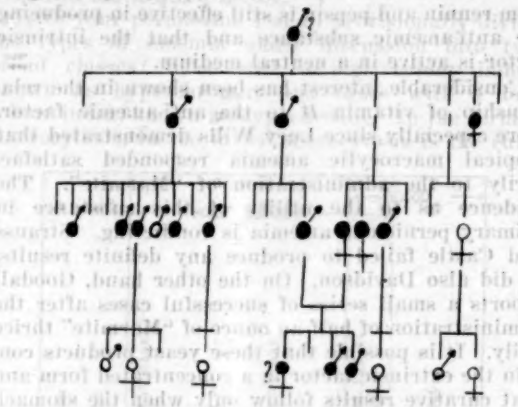

Figure V.
Showing familial factor: Maclachlan and Kline (1926).

A certain proportion of these patients suffer from spasmodic dysphagia, the so-called Plummer-Vinson syndrome, though this condition was first described by the British observers, Kelly and Paterson. Menorrhagia or amenorrhœa are frequent symptoms. Numbness and tingling of the hands and feet are often present, and changes in the nervous system are found in occasional cases.

Figure VI.
Showing familial factor: Witts (1930).

Inspection reveals an appearance of anæmia which varies from a waxy pallor to a lemon-yellow tint, suggestive of pernicious anæmia. The spleen is frequently palpable; the liver rarely so. There is often present a peculiar spoon-like concavity of some of the nails, which may also exhibit longi-

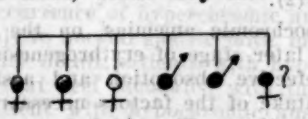

Figure VII.
Showing familial factor: Heath (1932).

tudinal striation. Achlorhydria is the rule, and the secretion of pepsin is diminished, but, as stated previously, the intrinsic factor of Castle is present and mucus is abundant.

The blood picture is characteristic. The red cell count is often high—indeed, nearly normal—but seven cases taken from the records of the Sydney Hospital wards showed an average count of 3,450,000. The hæmoglobin content is very low, ranging from 30% to 70%; the cases just cited showed an average content of 41%. The red cells are smaller than normal, microcytes are common, and a peculiar elliptical appearance of some of the red cells is almost invariable. There is no evidence of hæmolysis, and the leucocyte count is normal, or tends to show a slight reduction in all elements. Though singularly amenable to treatment, the disease is equally prone to relapse if treatment is suspended for any length of time.

The following short history is typical of some thirty others.

I.L., aged fifty years, was admitted to hospital on September 17, 1932, and discharged on October 7, 1932. The history was one of a constant feeling of tiredness for many years, sore tongue and chronic indigestion. For the last two months the legs had been swollen and the hands were numbed and cold. Physical examination revealed a lemon-yellow skin and bluish sclerotics. The nails on the hands were spoon-shaped, brittle and cracked. The tongue was pale, fissured and shiny from papillary atrophy. No source of chronic blood loss was discovered.

A full blood count was made on September 19, 1932. The red cells numbered 3,830,000 per cubic millimetre. The hæmoglobin value was 33%. The colour index was 0·43. The leucocytes numbered 6,040 per cubic millimetre. Microcytes were abundant.

A fractional test meal was given on September 20, 1932. Complete achlorhydria was found. After large doses of iron a blood enumeration on January 23, 1933, showed red cells to number 6,250,000 per cubic millimetre, the hæmoglobin value was 128%, and the colour index was 1·0. The red cells appeared normal.

Treatment.

The hyperchromic anæmias respond to sufficient doses of the anti-anæmic factor. During the period of blood destruction liver extract or a good preparation of hog's stomach is all that is necessary, since 90% of the iron and pigment complexes derived from the broken-down red cells is stored in the body. But under efficient treatment all the stored-up iron is exhausted in the synthesis of hæmoglobin for the hosts of new erythrocytes conjured from the marrow.

If the diet be not rich in iron-containing foods, the blood count fails to reach normal levels and the hæmoglobin value remains about 85%. It has been claimed that the increasing number of cases of subacute combined degeneration of the cord are recruited from this class of case. The more refined the anti-anæmic factor, the more magical its action, but the more restricted its scope. Raw liver contains iron in considerable amounts, and copper is also present. It is therefore highly desirable to substitute raw liver for liver extract for a day or two each week. If this is found impracticable, iron should be administered with the anti-anæmic factor during the periods of remission. The occasional occurrence of combined system degeneration in the hypochromic anæmias is another indication of the probable relationship of iron deficiency to spinal cord changes. In a recent issue of *The Lancet* Sargant reports definite improvement in a number of cases of subacute combined degeneration after massive doses of iron.

Since the hypochromic anæmias are due to lack of iron, the exhibition of the anti-anæmic principle stored in liver is quite useless. Much needless waste and in many cases much pecuniary sacrifice are caused by ordering expensive extracts in these anæmias. Some case can be made out for the administration of raw liver, since it contains iron; for the purified liver and stomach preparations there is none. The only treatment of any avail is the administration of massive doses of iron. Within seventy-two hours a reticulocyte response is noted. A great deal of work has been done to determine the best preparations and the optimum dosage. It appears that the multitude of iron preparations may be whittled down to four, namely, reduced iron, the scale preparations, insoluble ferrous salts (Blaud's pill), and soluble ferrous salts administered in pill form. Of these the cheapest is the citrate of iron and ammonia, the optimum dose of which is from 5·4 to 7·2 grammes (ninety to one hundred and twenty grains) daily. Needless to say, any dietetic vagaries—so common in these anæmias—must also be curbed and a balanced ration insisted upon.

The rôle played by copper in the cure of the hypochromic anæmias is distinctly a minor one. Whilst certain experimental results suggest that it acts as an adjuvant to iron, the evidence is conflicting. In any case, a well balanced dietary includes sufficient copper. There is considerable clinical evidence that hypothyreoid states induce a hypochromic anæmia, in which a reticulocyte response is produced by the administration of thyroxin. Each of the therapeutic agents hitherto enumerated has been concerned with the synthesis of hæmoglobin. It has recently been pointed out that certain amino-acids, especially glutamic acid, act in a similar manner. The claim of certain workers to have isolated a second liver fraction specific in the hypochromic anæmias has been discredited. On the other hand, the anæmias arising out of any of the avitaminoses respond more promptly to the administration of the missing vitamin in association with iron than to iron alone.

Summary.

No one is more conscious than myself of the omissions and deficiencies of this discursive address; the field I have attempted to cover has been too wide for the confines of a short paper. Not only the differences between the hyperchromic and the hypochromic anæmias, but also their relationships have been described. The fact that these anæmias can all be translated in terms of gastro-intestinal dysfunction has been emphasized, as has the part played by hereditary tendencies in their production and the type they assume. The clinical picture of primary hypochromic anæmia has been

described at some length, as it is certainly a definite symptom-complex, if not a definite disease entity.

From the specific nature of the anti-anæmic factors involved, an attempt has been made to draw a therapeutic moral which may be of assistance to you.

In conclusion, I should like to thank you for your patience, which I can only hope has been rewarded to some small extent.

AUTOCHTHONOUS CALCULI OF THE POSTERIOR PART OF THE URETHRA.

By Colin Edwards, M.B., Ch.M. (Sydney),
Honorary Urologist, Lidcombe State Hospital and New South Wales Masonic Hospital; Honorary Assistant Urologist, Royal North Shore Hospital, Sydney.

Prostatic calculi are described as being of three varieties:

1. True prostatic calculi.—To distinguish them from true urinary calculi, true prostatic calculi are frequently called "prostatic concretions" or "endogenous prostatic calculi". In their early stages at least these stones have no direct relationship with the urinary tract proper. They are formed within the alveoli of the prostate gland.

2. Secondary urethral calculi.—Secondary urethral calculi are migratory stones which have become lodged in the prostatic urethra or in a preformed prostatic pouch.

3. Primary urethral calculi.—Primary urethral calculi originate in a preexisting cavity in the prostate by the deposition of urinary salts. This variety is known as "autochthonous", that is, originating at the site where it is found.

Origin and Composition.

1. True prostatic calculi have a nucleus of *corpora amylacea*. These are small, round, oval or polygonal bodies found in the alveoli of the adult prostate. The name is derived from their resemblance to starch granules when examined microscopically, and also from the fact that in some cases they give the same reaction as starch with potassium iodide.

At first they are colourless, then successively yellow, brown and black. With increasing age they also increase in size, but they never achieve any considerable dimensions unless calcified. They have the consistence of hard rubber, but are laminated in structure, being formed from successive layers of lecithin, epithelial cells and inspissated secretion. Chemically, they yield lecithin and an albuminous substance. *Per se*, *corpora amylacea* are not pathological.

Occasionally these bodies undergo calcification by impregnation with lime salts. Such calculi may occur in enormous numbers and be of minute dimensions, or they may rupture the alveolar walls and become aggregated together to form stones of larger size. It is noteworthy that, although *corpora amylacea* are present in all adult prostates, these calculi are invariably associated with prostatitis.

2. Migratory stones, obviously, may contain any of the ingredients of renal or vesical calculi. They are of the same structure, with the proviso that any accretion which occurs while the stone is lodged in the urethra is chiefly terminal and is almost always phosphatic. Hence they are characteristically elongated in form if they are lying in the urethra itself. Otherwise they conform approximately to the shape of the cavity in which they are lodged.

3. Autochthonous urethral calculi are stated to be phosphatic and to be found only in cases with infected urine. There are records of urethral calculi consisting of oxalates or urates which are claimed to be primarily urethral, solely on the ground that there is no history of migration. This appears to be slender evidence on which to base such a claim, in view of the acknowledged rarity of authentic cases.

The presence of a primary urethral calculus implies the existence of a foreign body or some irregularity of the urethral wall which admits of urinary stagnation, such as a diverticulum or stricture. The chemical composition of the stone is then determined by the nature of the crystals formed in the urine passing over, and remaining within, the *cul-de-sac*. Further, calculus formation is favoured by the presence of numerous crystals or an excess of *débris* in the urine. These conditions obtain in grossly infected urines which are frequently alkaline and contain a heavy deposit of phosphates and detritus.

Case Report.

The present case is cited as an example of primary urethral stone formation in a patient with uninfected urine. The stone consisted of almost pure uric acid.

A.S.G., a squatter, aged sixty-four years, was referred with a provisional diagnosis of ureteric calculus. He had always enjoyed an active life, but had suffered intermittently from asthma for the last thirty years. He was unmarried, of very temperate habits, and a hard worker.

Some six months before he had a moderately severe attack of pain in the left loin which radiated towards the left iliac fossa. It was of short duration, did not cause sweating or vomiting, and has not recurred.

Soon afterwards the patient noticed some difficulty in commencing micturition, necessitating straining and delay. Urination was occasionally intermittent and he sometimes had the sensation of incomplete evacuation of the bladder with slight after-dribbling. No hæmaturia was observed, and the size and force of the stream were unchanged. Pain had appeared insidiously over the upper part of the sacrum and above the *symphysis pubis*. This became constant and increasingly troublesome. It was not relieved by rest nor provoked by work. On close interrogation the patient thought that he had suffered from this pain before, but had attributed it to other causes. There was no perineal or rectal discomfort.

Examination of the urinary system showed no abnormality in the abdomen or external genitalia. A second glass specimen of urine was clear to the naked eye, of acid reaction, and contained no abnormal constituents to chemical tests. Microscopically there were more epithelial cells and more *débris* than usual. Otherwise cells, casts,

organisms and crystals were absent. The urethra admitted an 18 (Charrière) rubber catheter and 50 cubic centimetres of residual urine were withdrawn.

Per rectum, the prostate was slightly enlarged, firmer than the average at his age, with a smooth, symmetrical outline. It was mobile and well demarcated from the surrounding tissues without projecting far into the rectum.

A plain skiagram showed three phleboliths near the lower end of the left ureter, the kidney shadows normal in size, shape and position, and marked spondylitis. Intravenous pyelography confirmed the X ray findings and demonstrated good and equal function on both sides with normal ureters. In the cystogram slight flattening of the bladder neck was observed, but there was no intravesical projection of the prostate, no trabeculation nor sacculation of the bladder. Unfortunately, urethrography was omitted.

Cysto-urethroscopy was attempted with several instruments, but failed, although a 24 (Charrière) sound could be passed. No crepitus could be felt with the sound in position and a finger in the rectum.

Microscopically the prostatic secretion contained a few discrete pus cells, but no other abnormal constituents.

Renal function tests gave satisfactory results.

Operation Findings.—Under spinal analgesia, suprapubic prostatectomy was performed. The internal urinary meatus was found to be definitely sclerotic and would not admit the finger tip. There was but little intravesical projection of the prostate. The meatus was incised and an extravesical gland of moderate size was removed with some difficulty, owing to dense fibrosis of the commissures. The lateral lobes were enucleated readily. During the course of the operation two stones were found in the substance of the gland.

As the rigidity of the circum-meatal bladder tissues precluded a successful operation of the Harris type, a V-shaped portion was resected from the vesico-prostatic "shelf" after the manner of Thomson Walker. After the usual toilet of the cavity and hæmostatic sutures had been inserted the wound was closed with small urethral and suprapubic catheters. Convalescence was uneventful and the patient was up and about on the fourteenth day after operation.

Pathology.—The gland was in three pieces when removed. Microscopically the cavities in which the stones had lain had a lining of mucous membrane. Otherwise the slides were not unusual, being chiefly adenomatous in the lateral lobes, with pronounced periurethral fibrosis.

As the specimen was too mutilated to be suitably preserved and the stones were obviously of an unusual character, the three pieces were sutured together and a transverse section was made. The accompanying sketch (Figure I) was drawn immediately after operation to show the site of the calculi in relation to the rest of the gland.

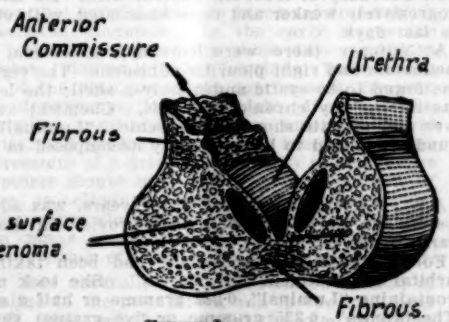

Figure I.

The calculi were located within the substance of the gland, about three millimetres (one-eighth of an inch) from the urethral mucosa on either side, with their flat surfaces facing medially and laterally. There were numerous abrasions of the urethra, probably due to the instrumentation and enucleation, but there was no visible preexisting communication between the urethra and the cavities in which the stones lay.

Figures II and III are photographs of the stones against an inch scale. The medial aspects can be determined by the scratches on the surface due to instrumentation. The surfaces are smooth, white and granular; in shape, the stones are discoid and remarkably similar. The maximum diameter is 1·45 centimetres, and the maximum thickness

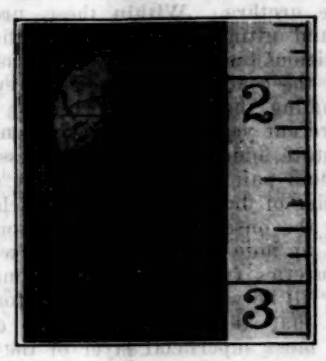

Figure II.

0·65 centimetre. Chemically they consist of 99% uric acid with a trace of calcium phosphate and calcium carbonate. A cut section of the stone makes it obvious from the colour of the laminations that the phosphates and carbonates constitute the most superficial layer.

Comment.

It is submitted that this is a case of autochthonous urethral uric acid calculus occurring in a patient with uninfected urine.

It is impossible to conceive the manner in which such stones could be formed without direct association with the urinary tract. Although no fistulous communication could be found between the urethra and the cavities, undoubtedly one must have existed.

Figure III.

As it is a *sine qua non* that true prostatic calculi have no connexion with the urinary tract, they cannot be formed of urates or uric acid. The present specimens must therefore be excluded from that category.

The dimensions of the stones are such that it would be impossible for them to have passed through the stenosed internal urinary meatus. There is no history to suggest migration, and the

peculiar shape can be accounted for only by the exertion of continuous pressure on both sides during the period of formation of the stones. Such a condition is found exclusively in the prostatic urethra. Migration may therefore be excluded.

It is suggested that this patient had (possibly congenital) bilateral diverticula of the posterior part of the urethra. Within these, urates were deposited and ultimately became calcified. Continual additions were made from the urinary stream, but the conditions of growth prevented the stones assuming the usual spherical or elongated form. Of recent years the increasing enlargement of the prostate added its quota of pressure. The history of loin pain may be reasonably attributed to the passage of uric acid crystals which probably accelerated the onset of vesical symptoms. It is interesting to note that the patient was taking alkaline diuretics from the time he consulted his own doctor till he was referred, about four months later, and that the phosphates and carbonates formed the most superficial layer of the calculi.

Summary.

1. The varieties of calculi found in the prostate gland and prostatic urethra are described.
2. There appears to be no record of an incontrovertible case of a uric acid calculus arising *de novo* in the urethra or in a urethral pouch.
3. The great majority of urethral calculi are associated with infected urine.
4. A case is described in which two discoid calculi consisting almost entirely of uric acid, were removed from the prostate gland.
5. Reasons are submitted for believing these to be autochthonous urethral calculi in a case with uninfected urine.

Bibliography.

R. K. Debenham: "Urethral Calculi", *British Journal of Urology*, Volume II, 1930, page 113.
J. Swift Joly: "Stone and Calculous Disease of the Urinary Organs", page 502.
E. L. Keyes: "Urology", page 411.
G. Marion: "*Traité d'Urologie*", Volume II, page 800.
J. W. Thomson Walker: "Surgical Diseases and Injuries of the Genito-Urinary Organs", page 739.
Russell Howard: "The Male Genital Tract" in Choyce's "System of Surgery", Volume II, page 953.
H. P. Winsbury White: "Stone in the Urinary Tract", page 227.
Young and Davis: "Practice of Urology", Volume I, page 382.

Reports of Cases.

THREE CASES OF "LUMINAL" POISONING.

By R. J. Millard, M.B., Ch.M. (Sydney), D.P.H. (Cambridge),
Sydney.

The use of "Luminal" is so general that it seems useful to record these three cases. The patients were admitted to the Coast Hospital, Sydney, with severe dermatitis and one of them died.

Case I.

V.S., a male, aged twenty-nine years, a labourer, was admitted to hospital on June 7, 1928, with the provisional diagnosis of scarlet fever and a history that he had been ill seven days, and that his "rash" had appeared six days previously. On further inquiry it was learned that for about four weeks he had been taking "Luminal", 0·09 gramme (one and a half grains), every night. After the last few powders he had felt hot and the rash had then appeared.

On admission to hospital his temperature was 38·46° C. (101·2° F.), the pulse rate was 94 and the respiratory rate 22 in the minute. There was a blotchy dark rash over the trunk and limbs. The skin was broken on the back and on the left elbow tip. The skin was very tender. The tonsils were slightly inflamed.

On June 9, 1928, there was no response to the Schultz Charlton test for scarlet fever. No diphtheria bacilli were found from throat and nose cultures.

On June 10, 1928, the rash was still persisting. There was profuse desquamation on face and trunk.

On June 13, 1928, the patient was very ill and his condition highly nervous. The blood, when subjected to the Wassermann and Kahn tests, gave no reaction.

On June 22, 1928, the patient was still very ill and had had jaundice for the past five days, with bile in the urine and clay-coloured stools.

On June 27, 1928, his condition was improving. He was jaundiced, but not so much as before.

On July 16, 1928, the patient had almost recovered, but still had some jaundice.

On August 15, 1928, he was discharged from hospital.

For the first two weeks in hospital there was severe pyrexia, ranging from 38·35° C. (101° F.) to 40·55° C. (105° F.).

Case II.

H.K., a male, aged sixty-one years, was a painter who had been working at his trade till fourteen days ago.

On January 14, 1933, he was admitted to hospital with a provisional diagnosis of measles. He had been under treatment for "pain in the back and high blood pressure", and from December 15, 1932, to January 1, 1933, that is, for eighteen days, had taken one "Theominal" tablet ("Luminal", 0·032 gramme or half a grain, "Theobromin", 0·325 gramme or five grains) three times a day. About January 1 he began to have abdominal pain and ulceration of the mouth. About January 7 a "rash" appeared.

On admission to hospital he was very ill, with a vivid, measly rash on the face, trunk and limbs. There were also blepharitis and conjunctivitis, ulceration of the lips and œdema of the pharynx. The temperature was 39·78° C. (103·6° F.), the pulse rate 110, and the respirations 32 per minute. There were moist crepitations at the base of the left lung.

On January 15, 1933, the "rash" was found to be an acute general dermatitis, resembling arsenical dermatitis. The urine contained lead 0·02 milligramme and arsenic 0·01 milligramme per litre. No punctate basophilia was present in the blood.

On February 2, 1933, the patient died. He had become progressively weaker and more emaciated, with oliguria in his last days.

At autopsy there were coronary atheroma, bronchopneumonia and right pleuritic adhesions. The right kidney was found to be cystic and merely a shell; the left kidney was affected by chronic nephritis. Chemical analysis of liver and of hair showed no arsenic. "Luminal" was not found; it is said to be completely decomposed in the body.

Case III.

A.W., a female, aged forty-three years, was admitted to hospital on April 1, 1933, with a provisional diagnosis of scarlet fever.

For the past four weeks she had been taking phenobarbital as treatment for "nerves". She took one tablet (containing "Luminal", 0·032 gramme or half a grain, and "Theobromin", 0·325 gramme or five grains) three times daily. Two days previously a "rash" had appeared, accompanied by headache and vomiting. The patient had had measles in childhood, but never scarlet fever.

On admission to hospital the temperature was 38·57° C. (101·4° F.). There was a patchy erythema of the face, trunk and limbs, and puffiness under the eyes. The buccal mucous membrane was inflamed.

On April 3, 1933, the temperature was normal. The erythema was now confluent and more vivid than before. On April 5, 1933, free desquamation was occurring. On April 22, 1933, the patient was discharged, still desquamating.

Comment.

The occurrence of a rash—generally measly—after the taking of "Luminal" is described in the text books as due to idiosyncrasy. It is frequently accompanied by severe constitutional disturbance, such as here recorded. In *The British Medical Journal* of October 18, 1924, the case is quoted of an epileptic girl, aged eleven years, who for three weeks was given "Luminal", 0·1 gramme, daily. A morbilliform rash appeared and developed into a general dermatitis resembling "Salvarsan" dermatitis. There was pyrexia up to 40·55° C. (105° F.), marked œdema, and painful fissures at the flexures of the joints. This was followed by desquamation of abdomen, back, hands and feet. After nine weeks the temperature became normal, but there was total loss of hair and nails.

Reviews.

DISEASES OF THE THYREOID AND PARATHYREOID GLANDS.

In many branches of medicine research proceeds apace; in none more than in diseases of the thyreoid, so much so that it is difficult to keep abreast of recent developments. A book on the subject is therefore welcome, one from an authoritative school still more welcome. Such we have in the "Diagnosis and Treatment of Diseases of the Thyroid Gland", by George Crile and associates.[1]

This large work arises from the collaboration of twenty-four members of a group all specially interested in the subject. It does not profess to be a text book, but the matters overlooked in it must be very few and we believe that here both physician and surgeon will find everything they require.

Dr. George Crile is himself the predominant and most voluminous contributor; also he is the most picturesque, witness the following:

> Iodine in organic or in inorganic form causes a greater control over the electrical conductivity of animal tissues than does any other agent.
>
> It is clear that the thyroid gland is not responsible for the actual execution of muscular, mental, and glandular work. The thyroid gland loads the gun; the nervous system, supplemented by the adrenal glands, fires it.
>
> Pulmonary tuberculosis is one of the diseases, the symptoms of which so closely resemble hyperthyroidism that careful study is necessary to establish the differential diagnosis. In the early stages the clinical pictures presented by these two conditions are almost identical; they include tachycardia, flushing of the skin, sweating, nervousness, tremors, digestive disturbance, loss of weight, dilated pupils, keen intellect, exaltation of the emotions, vivid personality. Hyperthyroidism and tuberculosis are each expressions of a drive of the energy system, hence the symptoms should in many cases be identical. If one were to eliminate just a single feature of pulmonary tuberculosis, that is, the lesion in the lungs, in many cases it would not be possible to differentiate either of these conditions from the other.

One subject that naturally receives attention is that of the rôle of iodine in the metabolism and in the treatment of the thyreoid. Those who believe that the administration of iodine alone may be curative and quite free from danger are informed: (i) that occasionaly an adenoma previously non-toxic may be rendered active by iodine, (ii) that the use of table salt to which iodine has been added is, in some instances, not without adverse effects as, given continuously over long periods of time even in small doses, it tends to produce hyperthyreoidism, (iii) that iodine is not an appropriate therapeutic agent for the treatment of goitre in adults. Our authors summarize the present status of the rôle of iodine in the prophylaxis and treatment of thyreoid diseases as follows:

> 1. Goiter results from an insufficient intake of iodine.
>
> 2. Congenital goiter occurs in the presence of a thyroxin deficiency in the mother and can be prevented by giving iodine if the mother has a normal gland, or by giving desiccated thyroid to the mother with a deficient gland.
>
> 3. Goiter can be prevented in those born with a normal thyroid by maintaining a sufficient iodine intake unless the efficiency of the thyroid is later lowered by the disease.
>
> 4. Iodine relieves hyperthyroidism but does not cure it and should be used only in preparing patients for operation.
>
> 5. Following operation, sufficient quantities of iodine to prevent compensatory hyperplasia tend to prevent recurrence.
>
> 6. In favourable cases, adolescent goiter may yield to treatment with small quantities of iodine.

In a work of this size room is found to survey the subject at every angle; nothing appears to have passed undescribed, room having been found even for the rôle of the operating room nurse as well as for the after-nursing of patients.

For anæsthesia, nitrous oxide and oxygen are recommended as they are thought to be less often followed by complications. Post-operative pneumonia is attributed in many cases to exposure and irritation of the sensory nerves of the trachea and larynx similar to that caused by foreign bodies. "The surgeon is the foreign body outside." The irritation produces mucus which may plug a bronchus with resultant infection, or even without plugging may infect the free mucus in the tracheo-bronchial system: "mucus, mucous plugs, collapse, pneumonia and death." The treatment recommended is extraction of the mucus through the bronchoscope as practised by Chevalier Jackson.

Not the least interesting chapter is one of 36 pages devoted to parathyreoid tetany for the treatment of which calcium is recommended in the enormous doses of calcium lactate 16 grammes (half an ounce or more) every two hours, or in more urgent cases the intravenous injection of calcium chloride 10 cubic centimetres of a 10% solution.

Very numerous references, apparently intended to be comprehensive, are made to the literature. Pride of place is awarded to the late Theodor Kocher, a very handsome and beautifully produced photograph of whom appears as a frontispiece. Graves, however, is named only once.

Throughout the work there occur foreign idioms uncouth to the English eye, but the technical language is beautifully clear; it is a pleasure to find such words as "hypertonus" in place of the base and common "hypertension". The illustrations are profuse, clear and instructive, greatly enhancing the value of the text. The printing and format are all that could be desired.

[1] "Diagnosis and Treatment of Diseases of the Thyroid Gland", by G. Crile and Associates; 1932. Philadelphia: W. B. Saunders Company; Melbourne, Brisbane and Christchurch: James Little and Son. Royal 8vo., pp. 508, with illustrations. Price: 40s. net.

A GREAT HEADMASTER.

In "Adamson of Wesley" Dr. Felix Meyer has successfully presented a series of arresting portraits of one who was recognized as the doyen of Victorian, perhaps of Australian, schoolmasters.[1]

In the preface he acknowledges his indebtedness to collaborators who have contributed chapters devoted to

[1] "Adamson of Wesley: The Story of a Great Headmaster", edited by Felix Meyer; 1932. Melbourne: Robertson and Mullens, Limited. Demy 8vo., pp. 226, with illustrations. Price: 10s. net.

the more public aspects of Adamson's life. Dr. Alexander Leeper writes with warm appreciation of Adamson as a churchman, and Mr. Frank Tate tells of the part he took in the development of secondary education in Victoria and in improving the qualifications and status of secondary school teachers.

It was, however, as the beloved head of Wesley that Adamson was most widely known, and Dr. Meyer has rendered a service to old Wesley boys and, indeed, to all public school boys by this work of which he modestly describes himself as the editor.

Adamson turned aside from a life of ease and leisure which ample bequests made accessible to him, and chose instead the exacting life of a headmaster and the task of recreating Wesley College. His confession of faith as a schoolmaster is given in words spoken before a church congress in Melbourne: "I must say most strongly that we lay schoolmasters also have a cure of souls and a humble share in God's work. We cannot divest ourselves of it if we would."

He regarded his appointment to Wesley as an opportunity to reproduce in Australia the public school spirit as he knew it at Rugby, which for him was summed up in the words "loyalty to a cause" and "service".

He rejoiced greatly, when the testing time of the war came, to find that Wesley boys, in common with those from public schools throughout Australia, made the response which he expected. Perhaps the most poignantly interesting chapter in the book is that contributed by Adamson himself, dealing with the war period and the boys whom the school sent forth. In them he saw the satisfying fruit of his soul's travail.

Public school sport was for Adamson an essential factor in developing the all-round character which he aimed at. For many years he exercised a wise and masterful influence on amateur sport as President of the Metropolitan Amateur Football Association and as delegate to, and later President of, the Victorian Athletic Association. For the same reason he encouraged dramatic performances by his boys as a preparation for public life, preferring the discipline of the stage to that of the debating society.

Wesley under Adamson was among the first schools in Victoria to adopt a regular system of medical inspection.

If one seeks to discover the qualities which go to make a great schoolmaster, they will be found in the portraiture of "Adamson of Wesley". Though he appeared to Professor Bailey, when at school, as "formidable", he held the confidence of his boys because of his belief in them and his manifest devotion to them. He had a deep understanding of a boy's instincts and reactions, and because he retained even to old age a certain simplicity and directness and boyishness of temper, he always knew the right thing to do and say when the interests of a boy were in question.

THE PHARMACOPŒIAS.

THE seventh edition of Thompson's Compendium is to hand.[1] This is a useful little book containing much information on a variety of subjects, particularly a synopsis of the various European Pharmacopœias with those of the United States and Japan. There is also a short but not very well selected list of modern remedies, official and unofficial, also unofficial and useful formulæ and prescriptions for stock mixtures for various ailments. The prescriptions conform to the requirements of the latest British Pharmacopœia. Other sections deal with the prevention and extermination of body vermin; applications to the feet; toilet preparations; spray inhalations; throat lozenges and hypodermic injections. Also the use of "Stovaine" and other solutions for spinal anæsthesia; antiseptic dressings and the treatment of wounds and burns; medicated baths; food for invalids; quarantine in infectious diseases. Again we have milk analysis and urine analysis; tests for poisons in drinking water; poisons and their antidotes. There is much information on a variety of other subjects including the *Dangerous Drugs Acts*; bacterial memoranda; incompatibilities; pill making and melting and boiling points. There is, in addition to the ordinary index with dosages, an index of diseases and remedies. In this we note the use of antipyrine for urticaria, regardless of the fact that this drug may itself produce urticaria. "Luminal" and phenobarbitone are given in different places in the book with different doses, oblivious of the fact that they are only different names for the same substance.

[1] "A Compendium of the Pharmacopœias and Formularies (Official and Unofficial), with Practical Aids to Prescribing and Dispensing", by C. J. S. Thompson, M.B.E.; Seventh Edition; 1933. London: John Bale, Sons and Danielsson, Limited. Demy 18mo., pp. 390. Price: 10s. 6d. net.

ENURESIS.

"Enuresis or Bed-Wetting", by R. J. Batty, is the title of a most useful book on this troublesome complaint.[1]

Dr. Batty gives an historical outline of the literature on the subject, showing how enuresis has been a sore trial to physicians and patients throughout the ages.

He discusses the anatomical and physiological basis of micturition and then the many causes of the defective bladder control of enuretics. He states that as there are so many remedies for this complaint, there are also many causes of it. He considers that heredity, bad home conditions, mental deficiency and physical defects, especially the presence of threadworms, are the chief causes to be considered. Many children are cured by training alone, anthelmintics, attention to diet, and adequate bed clothes.

Dr. Batty is a Lancashire county council health officer with a wide experience of children, and he seems by patient investigation to be able to find the causes of enuresis amongst his patients and to be able to cure them.

He has not much faith in drugs, but uses belladonna and ephedrine in some cases.

The book is well written and clearly printed and would act as a mine of information to many a sorely harassed general practitioner.

[1] "Enuresis or Bed-Wetting", by R. J. Batty, M.D., B.Sc., D.P.H.; 1933. London: John Bale, Sons and Danielsson, Limited. Crown 8vo., pp. 91, with illustrations.

Notes on Books, Current Journals and New Appliances.

HISTORY OF MEDICINE.

THE interesting series "Clio Medica", described as "A Series of Primers on the History of Medicine", is being expanded. Several volumes have already been noted in these pages. The latest additions are "Medicine in Canada", by Dr. William B. Howell,[2] and "Nutrition", by Dr. Graham Lusk.[3]

In "Medicine in Canada" Dr. Howell has attempted to give information "of more than local interest". He has not aimed at writing a comprehensive volume, but by his reference to the lives of some of the early practitioners, he has produced an eminently readable little book.

In "Nutrition" the late Graham Lusk has described the progress in the knowledge of nutrition from the ancient world, down through the middle ages to the present time. The illustrations in this book are most interesting, from Sanctorius (1561-1636) balanced on his steel yard, to Max Rubner, who died in 1932. Not the least interesting feature is the bibliography, which is divided according to the different eras described in the book. The editors of this series are doing a useful work and deserve to meet with success.

[2] "Clio Medica: A Series of Primers on the History of Medicine", edited by E. B. Krumbhaar, M.D. IX: "Medicine in Canada". Foolscap 8vo., pp. 150, with illustrations. Price: $1.50 net.

[3] "Clio Medica: A Series of Primers on the History of Medicine. X. Nutrition", by G. Lusk, Sc.D., M.D., LL.D.; 1933. New York: Paul B. Hoeber. Foolscap 8vo., pp. 153, with illustrations. Price: $1.50 net.

The Medical Journal of Australia

SATURDAY, OCTOBER 14, 1933.

All articles submitted for publication in this journal should be typed with double or treble spacing. Carbon copies should not be sent. Authors are requested to avoid the use of abbreviations and not to underline either words or phrases.

References to articles and books should be carefully checked. In a reference the following information should be given without abbreviation: Initials of author, surname of author, full title of article, name of journal, volume, full date (month, day and year), number of the first page of the article. If a reference is made to an abstract of a paper, the name of the original journal, together with that of the journal in which the abstract has appeared, should be given with full date in each instance.

Authors who are not accustomed to preparing drawings or photographic prints for reproduction, are invited to seek the advice of the Editor.

CIVILIZATION.

The average man or woman divides the human race into two groups—the savages and the civilized peoples. Most people know that civilization has waxed and waned in the history of the human race. The Chinese in the ages past had a culture that made them preeminent, though of a truth we do not know much about it. There were civilizations in Persia and in Egypt, and in other parts of the world. Greece, about which we know most, had a civilization of the highest order; and the Renaissance came as a tide of inspiration that had a lasting effect on western Europe. Most of this is known and yet people talk of the march of civilization as if civilization at present were a continuous movement forwards, as though there were no doubt that we are more civilized today than were the Greeks of the age of Pericles or the Italians of the Renaissance period. Although much depends on what is understood by civilization, the most liberal minded could not believe that Europe displayed much civility in the years 1914-1918. In his Jackson Lecture published in this issue, Dr. R. W. Cilento refers to civilization as a perennial plant, blossoming and declining. He mentions several factors in the decline of a civilization, but he is not concerned with what goes to make a civilization—the subject of his discourse does not demand it. He holds that man's highest welfare is the objective of a civilization and he believes that the health of the individual is the vital factor in the progress of every civilization. It may be of interest to turn aside from the subject of racial resistence discussed by Dr. Cilento, and to ask ourselves what civilization is and how we stand today in regard to it.

If we tentatively regard civilization as a state in which communities find themselves when they have emerged from barbarism, we must conclude that civilization is not a natural condition; it is something that has been acquired by, or has been imposed upon, a people. Man in his natural state could conceivably, and doubtless in the early ages did, acquire certain habits, certain ways of looking at things and so on, that made him different, that lifted him out of his barbarism. Further, a people thus changed, having subdued a neighbouring tribe or community, would be able either by force or by example to bring the conquered to adopt new modes of living. It is thus easy to understand how civilization has come to be regarded as dependent on social organization, on a form of government and on certain amenities of life that generally accompany such a state. Not unnaturally those who so regard civilization would esteem as most highly civilized the present age with its complex forms of government, its aeroplanes, its wireless transmission, its "talkies" and even its health organization. To these people civilization cannot be far from the end of its march. But civilization has waxed and waned, it has been like Dr. Cilento's perennial plant; it has been not unlike the remissions in a disease of the human body. It is worth remarking that Edward Carpenter in his book "Civilization: Its Cause and Cure" looks on civilization as a kind of disease through which the various races of mankind have to pass, as children pass through measles or whooping cough. He points out that many nations have been attacked by this disease, many have succumbed to it, some are still in the throes of it and in no single instance has a nation fairly recovered from it and passed through it to a "more normal and healthy condition". "In our modern life we find the unity gone which constitutes true

society, and in its place warfare of classes and individuals, abnormal development of some to the detriment of others, and consumption of the organism by masses of social parasites." Carpenter contends that in certain respects the barbarian was superior to so-called civilized man. The barbarian was in all probability comparatively free from bodily disease. Within certain limits he had more social unity and he was more easy minded. Since Carpenter regards civilization as a disease, physical, social, intellectual and moral, he discusses the nature of disease. Disease to him means loss of unity. The history of the word health corroborates this idea; the words health, whole, holy are from the same stock: "If thine eye be single, thy whole body shall be full of light" . . . "thy faith hath made thee whole." Carpenter holds that health with us is a negative thing; it is a freedom from disease. Health must be looked on as a positive thing. "Man to be really healthy, must be a unit, an entirety . . . so that not only the remotest and outermost regions of the body, and all assimilative, secretive, and other processes belonging thereto, but even the thoughts and passions of the mind itself, stand in direct and clear relationship to it, the final and absolute transparency of the mortal creature." Carpenter finds it difficult to define the power that works towards and creates the distinctive unity of each organism, but he thinks that it probably has to do with the growth of consciousness. Man is at present self-conscious; he knows little of a higher consciousness. The title of Carpenter's book shows that he thinks there should be a cure for the disease called civilization. He sees it already in the growth of a new and human society. He thinks that by getting closer to nature man will become healthier, healthier in the sense of whole. Whether he is right or wrong in this view need not be argued. It must suffice at the moment to concur with the conception of a disease, a disunity, of humanity; and to agree that there is need for a cure in the sense of a healing, a reunion—a reunion not on the basis of the old barbarity, but on the basis of wisdom, arising from a proper conception of good and evil.

In looking for the factors that are likely to bring about this reunion, it is worth considering the views of Clive Bell as set out in his fascinating book "Civilization". Bell holds that a man cannot be civilized until he possesses a sense of values. Such a man, in his opinion, will value art, thought and knowledge for their sakes, not for their possible utility. By this Bell means that he will value them as direct means to good states of mind which alone are good as ends. "The civilized man desires an education which shall be as direct a means as possible to what alone is good as an end." The civilized man "cultivates his powers of thinking and feeling, pursues truth and acquires knowledge . . . for their power of revealing the rich and complex possibilities of life". The first step towards civilization, according to Bell, is the correcting of instinct by reason and the second is the deliberate rejection of immediate satisfaction with a view to obtaining subtler. From these primary qualities, reasonableness and a sense of values, may spring a host of others which Bell sums up in the two words sweetness and light. To Bell's civilized man there will be no hidden chambers; he will not know prudery; he will never refuse a pleasure on principle, but his sense of values will convince him that by following his natural bent he would sometimes be sacrificing a superior to an inferior satisfaction. He must live richly rather than be rich. Bell thinks that only the few can become civilized, for civilization requires leisure. The Greeks built up their civilization because they had leisure. They cultivated the things of the mind. Work was done for them by slaves. Bell, therefore, believes that set work, particularly work under a superior authority, is incompatible with civilization. Every man should do the work that appeals to him. The civilized persons in a community are like the leaven that leavens the whole lump. It would be interesting and would break ground for a stimulating argument to refer in detail to Bell's views on how a civilization may be made, but this cannot be attempted. Bell's views may be described as based on intellectual rather than on spiritual considerations; they are not so hedonistic as they may appear. He shows clearly that if a community is to be truly civilized, the change, the reunion of Carpenter, will come from a change in the minds of men and women

and not as a result of any set formula or programme. Ouspensky, the Russian philosopher, in his important book "A New Model of the Universe" states that: "The beginning of culture comes from the inner circle of humanity . . . Later the principles of civilization develop and gradually create those forms of man's spiritual manifestation which are called religion, philosophy, science and art, and also those forms of social life which create for the individual a certain freedom, leisure, security and the possibility of self manifestation in higher spheres of activity. This is civilization." True civilization, according to Ouspensky, exists only in esotericism. "It is the inner circle which is in fact the truly civilized portion of humanity, and the members of the inner circle are civilized man living in a country of barbarians, among savages."

If we accept Bell's views that a sense of values and reasonableness are essential to civilization, and we see no reason why they should not be accepted, it is not a great step further to follow Ouspensky. Ouspensky's views explain why civilization has always died in successive waves, why the perennial plant has flowered to die again and again. At periods in man's history there have been a sufficient number of persons devoted to things of the mind, with a sense of values and guided by reasonableness, to disseminate their views for the uplifting of man. Back-sliding has occurred because some elements of barbarism are present in every wave of civilization. The civilizing force is in the minds of the few, the predatory instincts of the many are not eliminated and they destroy what threatens their realm of power; of course, the civilizers may fall from their high estate. In this sense, health, health of the mind, unity of the organism, has been essential to civilization. Survival of the fittest in the physical sense has nothing to do with true civilization. Physical health may even have been found more abundantly among barbarians than among any so-called civilized people. Ouspensky believes that man is gradually evolving to a state of what he calls superman, a man with a cosmic consciousness, a fourth dimensional man. This is the man of whom Carpenter speaks as opposed to the self-conscious man. Man must become conscious of his part in the cosmos before he will become civilized in the highest sense, or before he will be cured of civilization, in the words of Carpenter. The world will see little change in the peaks of its civilization until men forsake their greed of wealth and their lust for power, until they become cosmopolitan in the truest sense, and until the brotherhood of man is an established fact.

Current Comment.

TRAUMA AND THE RUPTURE OF HOLLOW ABDOMINAL VISCERA.

In November, 1931, two papers by C. E. Corlette were published in this journal; one was entitled: "Trauma in Relation to Organic Visceral Disease", the other was: "What Makes a Gastric or Duodenal Ulcer Perforate and What Protects It?" The first of these papers was read at a meeting of the New South Wales Branch of the British Medical Association, and the second was a mathematical discussion on certain points raised in the first. Corlette invoked Boyle's law and claimed that it showed that no increase of general abdominal pressure could cause strain in an ulcer and that perforation could not occur from that cause. Boyle's law, it will be remembered, is that at any given temperature the volume of a given mass of gas varies inversely as the pressure it bears. Some difference of opinion was expressed at the Branch meeting on the application of physical considerations to the body tissues. In view of this discussion it is interesting to note that J. V. Reed, of the Department of Surgical Pathology, of the Indiana University School of Medicine, United States of America, has made an experimental investigation of this subject.[1]

In his opening remarks Reed states that trauma and the rupture of hollow viscera have often been the subject of litigation. It was on this point that Corlette raised the question. Reed states that he has always felt that the laws of hydromechanics apply to the abdomen and its fluid contents, but that there was no proof that the laws of fluid pressure in living elastic cavities were the same as those determined for rigid, non-living containers. He has tried to determine whether Pascal's law applies to the living peritoneal cavity. According to Pascal's law pressure exerted anywhere on a mass of fluid at rest is transmitted equally in all directions. Reed carried out experiments with apparatus consisting of glass and rubber, and also made experiments on living dogs. The glass and rubber apparatus was ingeniously contrived and Reed was able to conclude that Pascal's law held good for a closed system with an intervening elastic

[1] *Archives of Surgery*, July, 1933.

membrane. In experimenting on a dog, Reed used "Sodium amytal" anæsthesia and exposed the stomach by a mid-line incision. An incision was made in the stomach wall, and into the organ was inserted a rubber balloon filled with water without tension. The balloon was attached to a rubber tube and the wound in the stomach was firmly sutured around the tube. Another rubber balloon, similarly filled and attached to a rubber tube, was placed in the abdominal cavity among the loops of intestines. The abdominal wound was closed and the tubes were attached to mercury manometers. When pressure was applied to the dog's abdomen the pressure in the two manometers was equal in every instance. Blows on the abdomen directly over the stomach caused an equal rise in both manometers, but no movements of the mercury could be observed that would indicate that the blow over the stomach caused a sufficient increase in the peristalsis of the stomach to lead to a rise in the intragastric pressure. Reed, applying these observations to the rupture of a gastric ulcer, points out that if it took an appreciable time for the intraabdominal pressure outside the stomach and the intragastric pressure to become equalized, rupture of an ulcer might occur during this interval. At the New South Wales Branch discussion one of the speakers said that when pressure was made on the abdomen, the stomach had to "take up" the pressure, and once the pressure was relieved, the stomach had to relieve its pressure also. Reed recorded the movements of the mercury on a revolving drum, and he found that the extragastric increase and the intragastric increase in pressure occurred simultaneously.

Reed also dealt with certain conditions in which it is known that hollow viscera do rupture. Those interested in this question must consult Reed's article for details of his observations. Our purpose is to raise the question of rupture of gastric ulcer. Admittedly it is not always possible to refer to the human body results obtained in experiments on animals, yet even the most sceptical will be forced to admit that Reed's results are most suggestive. Both Reed and Corlette believe that the laws of physics are applicable to living tissue. They have the weight of evidence on their side. We must conclude that if physical laws hold good outside the body, they hold good inside the body. In view of the experimental results of Reed, the onus of proof rests on those who would except the body from the application of such laws as Boyle's and that of Pascal.

THE TREATMENT OF POLYCYTHÆMIA.

The condition known as *polycythæmia vera* or erythræmia is notoriously difficult to treat. It is held to be due to an excessive erythroblastic activity of the bone marrow. There is, in addition to enormous increase in the number of the erythrocytes, an increase in the viscosity of the blood and in its total volume. In many respects it is comparable to the disorder of the white blood cells known as chronic myelogenous leuchæmia. Several methods of treatment have been used and, though in certain instances remissions can be brought about, the patient is not cured of his disease. Venesection has been used; it is of passing benefit only and probably acts detrimentally by acting as a stimulus to new blood formation. Arsenic has been given with varying success; references in the literature to its use are somewhat meagre. Phenylhydrazine, a drug that has lately come into prominence, acts by destroying the blood cells in the blood stream. Irradiation by X rays or radium has in its favour its inhibitory action on the bone marrow. Of these forms of treatment irradiation would appear to be the most logical, and there is no doubt that in expert hands some useful results have been attained. It is not intended to discuss these forms of treatment *seriatim*, but to draw attention to a paper by C. E. Forkner, T. F. McN. Scott and S. C. Wu[1] on the treatment of this condition with a solution of potassium arsenite U.S.P. (Fowler's solution).

These authors have treated six patients with relatively large doses of potassium arsenite and have obtained distinct clinical and hæmatological improvement in each instance in periods varying from twenty to fifty days. During these remissions the red cell count, the hæmoglobin value, and the hæmatocrit value were reduced to normal or nearly normal (the greatest reduction of the red cells was from 9,190,000 to 4,820,000 per cubic millimetre). Further, the basal metabolic rate returned to normal, body weight increased, strength increased and symptoms either became less pronounced or disappeared. Forkner and his co-workers describe in detail their method of dosage. They give 0·18 or 0·24 mil (three or four minims) three times a day for a start. After two days the total daily dose is increased by 0·18 mil (three minims); this amount is given for two days. Thereafter the dose is increased at the same rate until the first sign of intoxication, anorexia, is noted. They found that this occurred when the daily dose reached 1·48 mils (24 minims). After this the dose must be increased more slowly. They state that by this means the dose may be carried up to 0·74, 0·92 or 1·25 mils (12, 15 or 20 minims) three times a day. When considerable improvement has occurred, the drug is gradually withdrawn until the patient is taking 0·3 mil (five minims) three times a day; this dose may be continued without harm for "at least several months". The periods covering the authors' observations ranged up to 120 days. They point out that the drug is best given with or immediately after meals well diluted in orange or tomato juice or some other flavoured drink.

The number of cases reported by these authors is small, and their results on that account must not be received with too much enthusiasm. It is possible that arsenic therapy has been neglected in this disease and that in certain cases it will yield results, temporary, of course, but superior to those obtained

[1] *Archives of Internal Medicine*, April, 1933.

by phenylhydrazine and irradiation. It is necessary to remember that arsenic therapy is liable to have certain unpleasant effects. These are described by Forkner and his fellow workers. The possible sequelæ will have to be weighed against the temporary effects of the drug on the blood picture.

CHOLELITHIASIS.

The causation of cholelithiasis is a vexed problem. It is more or less generally conceded that infection of the gall-bladder may play an important part, and it is well known that *Bacillus coli* in some instances and *Bacillus typhosus* in others may be cultured from the cut surfaces of gall-stones. But in some cases organisms cannot be cultured from any of the contents of the gall-bladder. For this and other reasons many authorities believe that stones may form without the influence of preceding infection. They believe that the main cause is faulty metabolism as manifested by a high blood cholesterol content. Certainly increase in the blood cholesterol content is a common accompaniment or precursor of cholelithiasis. There are, of course, many other possible factors. In a recent paper P. Desgeorges, Physician at l'Hôpital Civil, Vichy, stresses the importance of infection and attempts to disprove the metabolic theory.[1] He points out that within recent years many observers have lost faith in the theory that infection with *Bacillus coli* is the principal cause of cholelithiasis; but, in 1925, Moynihan remarked that women were twice as subject to the disease as men, that they were also far more liable to pyelitis, cystitis and colon bacilluria, and that there appeared to be a connexion between infections of the urinary tract and infections of the gall-bladder. This naturally aroused the question whether infection with the colon bacillus caused hypercholesterolæmia, as infection with the typhoid bacillus was known to do. Desgeorges remarks: ". . . as far back as 1924 I had stated that coli-bacillary infection gives rise to hypercholesterolæmia and insisted on the far-reaching importance of this view . . ." He has also insisted that when the colon bacillus is found in the urine it can be found in the blood and bile as well; the infection is nearly always blood-borne, and the organisms are eliminated in the bile as well as the urine.

Desgeorges investigated 11 men and 53 women suffering from chronic urinary infection with *Bacillus coli*. None of the patients had gall-stones or any disease known to increase the cholesterol content of the blood. He found that the blood cholesterol content of ten patients was 1·07‰ to 1·7‰; of 12 others, 1·7 to 2·0; of 27, 2·0 to 2·5; of 11, 2·5 to 3·0; and of the remaining five, 3·0 to 3·5. He states that chronicity of the disease seemed to have more influence than previous pregnancies. In a later series, of 13 men and 39 women, he found an average blood cholesterol content of 2·17‰. Moynihan obtained a similar figure in his investigation of 101 patients suffering from cholelithiasis.

Desgeorges expresses the opinion that, excepting in a few cases, such as those of the solitary cholesterol calculus and lithiasis of the newly born, hypercholesterolæmia plays a secondary part only in the formation of gall-stones. It has been shown by several observers that increase in the cholesterol content of the blood does not necessarily imply an increase in the cholesterol content of the bile. It is not because of hypercholesterolæmia that women after pregnancy or convalescents from typhoid fever develop gall-stones, but because their gall-bladders are affected with lithogenic catarrh due to irritation by typhoid or colon bacilli. This theory, he states, accounts for all the circumstances associated with the formation of gall-stones. Moynihan states that the infection responsible for gall-stones is mild and is apt to be recurrent; this is evident from the frequent absence of organisms in the diseased gall-bladder and from the existence, in many cases, of several "generations of stones". Desgeorges remarks that these conditions are provided by colon bacillary infection. Desgeorges's views, of course, are not entirely new; but it is worth while to draw attention to them here because of the possibilities that they suggest in the way of prevention and treatment. There is insufficient evidence to warrant their complete acceptance.

[1] *The Practitioner*, August, 1933.

THE MEDICAL OFFICERS' RELIEF FUND.

The Medical Officers' Relief Fund (Federal) was inaugurated during the Great War for the purpose of enabling medical officers who were in financial difficulties on account of active service to rehabilitate themselves. Grants were made to enable men to start again in private practice, and grants were also made to the dependants of deceased medical officers when they were left in straightened circumstances. The trustees of the fund have administered it and have made reports every year to the Federal Committee of the British Medical Association in Australia. At the first meeting of the Federal Council, recently held in Sydney, the trustees reported that no grants would be made to medical officers at present, but that grants could be made to widows and dependants of deceased medical officers who were in need. It was pointed out that the existence of the fund was not generally known, and it was thought that if an announcement were made in the pages of this journal, medical practitioners might be induced to bring to the notice of the trustees any cases in which assistance was needed. The funds available are not large, but the trustees feel that they should be used to the best advantage. Advisory committees exist in every State, and medical practitioners hearing of cases in which assistance should be given, will be able to ascertain the personnel of the advisory committee on application to the Honorary Secretary of the Branch in their State.

Abstracts from Current Medical Literature.

SURGERY.

Suppurative Pericarditis.

Gilbert Cottam (*The Western Journal of Surgery, Obstetrics and Gynecology*, February, 1933) writes about suppurative pericarditis and gives a description of a case in which drainage was made through a new approach. The subject of the drainage of the pericardium is one which has attracted attention for nearly three hundred years. Suppurative pericarditis, being always secondary to some other serious disease, always presents a serious problem. The hazard is increased by the impossibility of early diagnosis and the fact that many diagnoses are overlooked even in larger effusions. The death rate is always high. The treatment is purely a matter of adequate surgical drainage, with the least interference and the utmost conservation of the resources of a desperately ill patient. No drainage can be considered adequate which does not provide for the evacuation of the deeper recesses of the pericardium. This is best accomplished by a right-sided approach, preferably through the fifth costal cartilage, fairly close to the sternum. Through this the internal mammary vessels may be tied, the pleura may be displaced outwardly and the pericardium at the back of the heart may be reached with a tube through which dependent drainage can easily be secured with slight change of posture.

Regenerative Capacity of the Extrahepatic Biliary Tracts.

George Halperin (*Surgery, Gynecology and Obstetrics*, May, 1933) writes about the regenerative capacity of the extrahepatic biliary tracts. Operative procedures required for the repair or reconstruction of the extrahepatic bile tracts present a number of difficult problems. Cicatrical stenosis and partial or complete obliteration of the common bile duct, as well as of the hepatic duct, may be caused by the following conditions: Congenital anomaly, such as diverticulum of the common bile duct; benign and malignant neoplasms involving the common bile duct, the head of the pancreas, papilla of Vater, the gall-bladder or the cystic duct; inflammatory conditions; decubitus ulcer in the common duct caused by a stone; inflammatory induration of the lower end of the common duct, the result of a large callous ulcer of the duodenum; acute or chronic indurative pancreatitis; post-operative strictures. The first three groups are relatively rare. The greatest number of cases calling for repair or reconstruction is furnished by the post-operative group. The most frequent cause of post-operative stricture of the choledochus or the common hepatic duct is a technical error committed in the course of a cholecystectomy and passed unnoticed at the time. Occasionally stenosis has taken place after a supraduodenal choledochotomy done for exploration and removal of stones, regardless of whether the incision was drained or closed primarily. The use of a T-tube, especially if too early removed, has been a not infrequent cause. Causes leading to stenosis of the extrahepatic bile ducts are discussed and clinical evidence regarding their regenerative capacity is deduced. From the analysis of the results of various methods of reconstruction, it is apparent that the stumbling block to success is the question of adequate blood supply to the new channel. That is particularly true of the method of fistula implantation and also of flap methods. The method of bridging a gap with a rubber tube was given particular consideration. Clinical evidence regarding its efficacy was found to be contradictory. Adherents of the method concluded that success was explainable on the basis of extraordinary regenerative capacity of ductal epithelium. The epithelium, they believed, grew along the prosthesis and lined the new channel. The question of regenerative capacity of ductal epithelium was studied experimentally. It was found that epithelium would proliferate and fill longitudinal defects, even if extensive, provided there were no excessive inflammatory reaction at the site of repair. The question of blood supply to the epithelium was again found to be the determining factor. It was found that epithelium would not grow along a tube and would not regenerate a transverse gap. This experience coincides with the *post mortem* evidence of clinical cases. The importance of adhesions as a factor in a favourable outcome is emphasized. This idea receives its support from the observations of Cahen, Lahey, Museneeck, and the author's own experimental work. There is no one satisfactory method at the present time of dealing successfully with cases of extensive bile duct obliteration in which direct anastomosis is not possible.

Sacro-iliac Arthritis.

Theodore A. Willis (*Surgery, Gynecology and Obstetrics*, August, 1933) discusses sacro-iliac arthritis from the standpoint of an anatomist. Several years ago the author reported frequent ankylosis of these joints while no other joints in the body were involved. The author has reviewed the findings in over fifteen hundred human skeletons and reports the presence of firm ankylosis in ninety-six of them. Two chief types of change were found. One which occurred mainly in young people, consisted of a smooth calcification of the anterior sacro-iliac ligament. The other type of bone change found was of the nature of marginal lipping and some degree seemed to be almost universal after forty years of age. In sixty-seven skeletons the two types were coexistent in varying degrees of severity. Of the ninety-two pelves with arthritic ankylosis, only two were those of females. Congenital synostosis was present in only four of the total series. Sacro-iliac ankylosis of all kinds is practically three times as frequent in the male as in the female. The author stresses the three causative factors, namely, age, mechanical strain, and focal sepsis, although admitting his inability to evaluate properly the various factors. Lipping is earliest evident and later most marked in that part of the joint helping to form the pelvic brim. Ankylosis is to be regarded as a compensatory mechanism to procure stabilization.

Surgery of the Biliary Tract.

L. Waldeyer (*Deutsche Medizinische Wochenschrift*, May 26, 1933) has analysed a series of 571 cases of operations on the biliary tract. There was a mortality of 1·8% in cases of chronic cholecystitis without stones, a mortality of 2·4% in cases of chronic cholecystitis with stones. In the complicated and among the more elderly patients there was a marked higher mortality. In the follow-up of patients, 62·5% were completely free of symptoms and only 3·2% unimproved, whilst the remaining 34·3% were fully fit for duty, but now and then had symptoms. With early operation the direct operative risk is small; with the supervention of severe infection or with a lengthy block of the common bile duct the mortality rapidly rises. As a result of these investigations the often-stated request for an earlier operation and at a younger age seems justified.

Deferred Operation in Peri-appendicular Abscess.

Carl A. Meyer (*Western Journal of Surgery, Obstetrics and Gynecology*, March, 1933) discusses the value of the deferred operation in the treatment of periappendicular abscess. The mortality rate for acute appendicitis has increased in the United States of America from less than 10 per 100,000 in 1900 to more than 15 in 1929. The present high mortality rate is due to the large number of cases of acute appendicitis in which perforation is allowed to occur. There are two schools of thought: that following the teaching of Murphy advocates operation immediately following the diagnosis; the second school, influenced largely by Ochsner, urges removal in early cases, but would defer operation in the neglected later cases. The author has reviewed all cases of acute appendicitis treated at the Cook County Hospital during the years 1930-1931. Of these patients, 173 presented symptoms of an acute appendicitis and in them a palpable mass was demonstrated. The average lapse of time from the first attack of pain to admission to hospital was 6·3 days, the extremes being from two to twenty-one days. Following the previously mentioned two schools of

thought, the cases treated could be divided into two groups. In the deferred group there were 84 cases with only one death. The patient who died had been ill for thirty days and was comatose on admission. He died within six hours. At autopsy extensive pyelo-phlebitis with multiple liver abscesses was demonstrated. Among the 83 patients who recovered spontaneously, the average stay in hospital was 13·4 days. The operative group includes 89 cases, subdivided into three groups. Group *A* consists of those patients operated on shortly after admission to hospital, and this group contains 28 cases with 25 recoveries. The three deaths were all among "poor surgical risks". Group *B* consists of those cases in which operation was first deferred, but which were subsequently submitted to operative drainage because of enlargement of the mass. There were 18 cases in this group with one death. In this patient draining was performed twenty-two days after the onset of her symptoms and she died twelve days after the operation. *Post mortem* a subphrenic abscess was found, which had perforated into the lung. Among the 17 patients who recovered, the average stay in hospital was thirty-four days. Group *C* consists of those cases in which operation was deferred, but in which operation had later been performed before symptoms had fully subsided. There were 46 cases with 39 recoveries and with seven deaths. These deaths were due to supervention of diffuse peritonitis and appear to be the results of untimely surgical interference. In the entire number of 89 operated cases there was a mortality of 12·3%, although the mortality for the entire series of 173 abscesses was 6·9%. The procedure of primarily deferring operation in periappendicular abscesses and using drainage only for those patients who are growing worse, and in spite of the Ochsner management, gives the better results. The author himself drains those abscesses which may be entered without contaminating the general peritoneal cavity. Other patients are placed in Fowler's position and are fed intravenously. The size of the mass, temperature variation, and leucocyte count are carefully watched. The author has been surprised to find so few evidences of preceding abscess when the patients have returned for appendicectomy after an interval of from four to six months.

Epiphrenal Diverticulum of the Œsophagus.

EMIL GRANT (*American Journal of Surgery*, February, 1933) reports a case of epiphrenal diverticulum of the œsophagus. The anatomical classification of diverticulum of the œsophagus is that most commonly employed. Those which are pharyngo-œsophageal usually arise from the posterior wall of the pharynx and can be treated surgically. Diverticula of the epibronchial type are situated in the mid-position of the œsophagus and often result from adhesions to adjacent structures, combined with the intra-œsophageal pressure of food. The epiphrenal diverticula occur in the lower third of the œsophagus. The author has been able to find only 31 proven cases of this type reported in the literature. The first occurred in a case record of the year 1833. In 1898 the first case was diagnosed by X ray examination. The ætiology of traction diverticulum is determined by previous pathological change in the region. Dessecker points out that the œsophagus turns slightly to the left in its lower third, hence food boli may impinge upon the right border of the curve so formed. The left anterior relationship is with the heart and pericardium. Posterior enlargement is improbable because of the presence of the vertebral column. In 28 reported cases only three were left-sided. In the author's case the patient had lost 6·3 kilograms (fourteen pounds) weight in one year, had anorexia, and a silent carcinoma was suspected. There were at no time symptoms of dysphagia, pressure, regurgitation, vomiting or pain. Four years after initial examination the patient's condition and symptoms were unchanged. There was no concurrent cardiospasm.

Carcinoma of the Transverse Colon.

THEODORE S. RAIFORD (*Surgery, Gynecology and Obstetrics*, April, 1933) discusses carcinoma of the transverse colon. Carcinomata are relatively rare in the transverse colon, only 7·3% of all carcinomata of the colon being located in this region. The clinical features differ little, if any, from those of carcinomata elsewhere in the bowel. Symptoms frequently simulate those of upper abdominal pathological conditions, such as gastric lesions or gall-bladder disease, and confusion of diagnosis is not rare. An achlorhydria is found in the majority of cases. Diagnosis is made by X rays following both a barium meal and a barium enema. In cases in which the findings are doubtful the series should be repeated. It is surprising to find that tumours arising from the transverse colon involve the glandular system relatively infrequently. Metastases have a predilection for the liver. More common than metastases, however, is direct extension to the stomach and omentum, thereby causing the condition to be confused with carcinoma of the stomach. The majority of these tumours assume an annular constricting form and cause symptoms of partial obstruction. Histologically, most of the tumours are of the adeno-carcinoma type, with secondary mucoid degeneration. This accounts for their tendency toward extension to adjacent structures with increased operative difficulty. The optimum treatment consists of early radical resection, followed by anastomosis. The operator should give particular attention to the amount of bowel resected, the preservation of blood supply to the stumps, the prevention of tension on the anastomosis, and the method of anastomosis. Lateral anastomosis is to be preferred to the end-to-end method. The iso-peristaltic or "thumb" method of anastomosis devised by Bloodgood is an advantageous procedure when sufficient bowel can be obtained without tension. This method allows a possible rupture of the blind ends to take place outside the peritoneal cavity without causing peritonitis. The results of treatment in twenty-two cases have not been gratifying. Five-year cures have resulted in only three cases, and cures of shorter duration in the same number. Post-operative deaths were six, and deaths from inoperability or recurrence number six. The evaluation of early symptoms by the clinician, with a resultant early diagnosis, and careful attention to the above-mentioned technical factors by the surgeon should enhance the patient's chances of recovery.

Jejunal Ulcer.

F. GREGORY CONNELL (*Western Journal of Surgery, Obstetrics and Gynecology*, April, 1933) discusses jejunal ulcer in the light of twenty-six years' experience since his first communication to the Western Surgical Association in 1907. Up till that time only 38 cases had been reported, but since then the subject has assumed a position of importance. The paramount importance of hyperacidity is evident from the anatomical site of peptic ulcer, namely, in relationship with the stomach or at Meckel's diverticulum adjacent to cells secreting hydrochloric acid. As regards symptomatology, there is always a definite long or short free interval following the short circuit operation. Bleeding is frequent, hydrochloric acid is always present, true achylia makes the diagnosis questionable. With a view to diminishing the secretion of hydrochloric acid, the author advocates a low salt or salt-free diet. Medical treatment follows the same lines as that of an uncomplicated chronic peptic ulcer. There are two chief steps in the surgical treatment of a typical case. A gastro-enterostomy with removal of ulcer forms the first step, whilst the second consists in reestablishing the intestinal canal. Such reconstruction will vary according to the position of the initial lesion and the type of the original operation. The author draws attention to an operation described as "fundusectomy", with retention of the lesser curvature, as a means of diminishing the secretion of hydrochloric acid. "It may be likened to the removal of the Meckel's diverticulum in cases of peptic ulcer of the ileum, after which recurrences are unrecorded." Among the advantages of fundusectomy the author mentions the retention of the pyloric mechanism and the avoidance of complete achylia. The disadvantage of the operation is that the ulcer is not removed, but the same objection may be applied to many other methods of treatment.

Special Articles on Treatment.

(Contributed by request.)

XIX.

THE TREATMENT OF CALLOSITIES, CORNS AND WARTS.

In order to understand better the rationale of treatment of callosities, corns and warts, it is advisable to refer briefly to their ætiology and pathology. Callosities usually clear up when the cause is removed. Salicylic plasters *et cetera* are used; excision may be necessary.

Callosities and Corns.

Callosities and corns arise chiefly in connexion with the epidermis, and are formed by a hyperkeratosis, due to an interference with the natural formation of the corneal layer of the skin. This interference may be due to unnatural or irregular pressure upon the areas affected. With a corn there is a deep extension of the horny growth in the form of a peg, which presses upon the true dermis, causing much pain and a chronic inflammatory thickening of the deeper structures. So that, in considering treatment of these formations, we must take into account and remedy, if possible, any condition such as ill-fitting boots, shoes *et cetera*, also such occupations as give rise to callosities due to the pressure of certain tools *et cetera* —even the handling of golf sticks in certain people gives rise to these troubles. In some people the skin of the feet and hands is predisposed to hyperhidrosis, and this condition favours the development of these troubles.

In order to prevent the irregular pressure factor, properly fitting boots and shoes must be worn; and patients who have had the trouble for some time will find it necessary to wear corn protectors, of which there are numerous devices of different sizes, shapes *et cetera*. These are so arranged that the pressure occurs upon parts away from the corn, in order to lessen pain, especially whilst the corn or callosity is being treated. In all these conditions it is advisable to apply an antiseptic lotion, as these conditions, when operated upon, are apt to become infected. I am now referring more particularly to conditions of the feet and hands, where there may be several lesions. It is advisable to prescribe an antiseptic lotion for bathing these parts night and morning. The actual keratotic thickening of the skin may in the first place be pared off carefully with a suitable knife. In some cases I find a "Gillette" razor blade useful for removing the outer layers of the horny substance.

I then recommend the use of keratolytics, such as salicylic and creosote plaster mull, or some other suitable salicylic application.

In treating corns, if the case is suitable, and I find many are, I paint the lesion with tincture of iodine and apply a suitable radium applicator or X rays.

If the removal of the corneal layer is fairly successful, and the amount of the corneal thickening is about two millimetres deep, I then apply a radium applicator which will emit the hardest β rays and, of course, the γ rays. The idea is to irradiate the subcorneal inflammatory tissue, to relieve pain and prevent recurrence when the growth has been removed.

For such a purpose I apply radium applicators, the radium being contained in monel metal holders, 0·2 millimetre in thickness. These holders are placed in rubber tubes two millimetres in thickness and containing radium element equal to five milligrammes.

These applicators allow the hardest β rays to reach the inflammatory structures. And an application of one or two such holders for one and a half hours is often sufficient. If the abnormal hyperkeratotic formation has been completely pared away, the time of the radium application must be reduced accordingly.

I remember, when at boarding school, a boy friend of mine had a habit of gnawing at a prominent knuckle on his right fist. I remonstrated with him and said it was a beastly, dirty habit to be continually eating himself. I recognize now, the lump he had produced was a callosity, but he used it as a pseudo knuckle-duster.

However, a more interesting case was that of a man who came to see me some years ago. He said: "I have not come as a patient, but I thought you might be interested in the peculiar condition of my nails." He had had, as long as he could remember, the habit of breaking his nails, with the result that the chronic inflammation produced by this habit caused his nails to become rough and thickened to such a condition that they were a quarter of an inch in thickness and looked more like miniature hoofs. He stated that treatment had been of no avail, as the twisting and breaking of his nails went on in his sleep. It was in the pre-pyjama age, as he stated he used to soil with blood stains the white nightshirts worn in those days.

If one has not suitable radium applicators for administering deep β rays, one should use the standard needles containing five milligrammes of radium element and encased in platinum 0·5 millimetre thick. The time of application must be increased accordingly. When the lesions are numerous, as they are sometimes on the soles of the feet, one may use X rays, giving a suitable dose to effect inflammatory conditions at such a distance as suggested by the growths. Of course, I do not suggest it is necessary to apply radium or X rays in all cases of corns. But I have found the time of treatment, prevention of recurrence and control of pain greatly favoured by this method of treatment. Most callosities are not painful and only require suitable paring and the use of keratolytics, with attention to the removal of the source of irregular pressure *et cetera*. It is advisable to wear suitable corn protectors for some weeks after the removal of a corn.

Under a corn there is frequently a bursa. X rays and radium have a destructive effect upon this formation, lessening the risk of recurrence after its removal and also preventing infection of the bursa, which may give rise to troublesome complications if not cured.

Soft corns between the toes are often very painful. They are macerated by the conditions of the parts affected. They react well to radium treatment or other suitable treatment for corns; it is well to place an india-rubber sponge between the toes to stop pressure whilst they are under treatment. The following prescription represents a useful application for corns:

℞

Salicylic acid, one drachm.
Extract of *cannabis indica*, ten grains.
Collodion, six drachms.
Sulphuric ether, two fluid drachms.

Apply night and morning and then remove the destroyed horny matter before making another application.

Warts (Verrucæ).

Of warts there are many different clinical varieties, but their pathology is very similar. They affect particularly the prickle cell layer of the epidermis with enlargement of the papillary layer, and evidence of a vascular supply is seen when a wart is cut, as in shaving. There is also in some warts a certain amount of thickening of the corneal layer, as in *verruca plana*—flat warts.

Two books upon dermatology by British authors, just to hand, vary in their descriptions of the ætiology of warts. One of them, "A", states that the wart is due to a circumscribed hypertrophy of the epidermis, the layer deeply involved being the *stratum corneum*. The other author, "B", states that the wart is due chiefly to an alteration in the prickle cell layer of the skin.

However, I think we may take it that "B" is correct, and there is likewise in some warts a considerable hypertrophy of the rete into the intercapillary formations, with a definite increase in the vascular structure, as evidenced by the free hæmorrhage when warts are cut.

In what are called *verruca plana* and some other warts there is also a certain amount of hyperkeratosis. The treatment, however, is aimed at the papillomatous development in these conditions. Radium or X rays can play a very useful part in the treatment of them, especially where the warts are numerous or in patches, as they sometimes occur in *verruca plana*. A three-quarter erythematous

dose of X rays or a stronger application through a filter, as 0·5 millimetre of aluminium, is very useful, and when the warts are shrivelling up, in about ten days' time, to apply carbonic snow (solid). Carbonic snow is often used alone for some warts. As it has been shown that *verrucæ planæ* and probably other warts are due to a filtrable virus, and that some warts, especially the large warts of the scalp, are predisposed to pyogenic infection, it is advisable to prescribe an antiseptic lotion, such as "Sypol", "Eusol" or some suitable carbolic lotion, during the treatment of these conditions.

For large warts of the scalp placed close together I have inserted radium needles. These needles are 0·2 millimetre (monel metal) in thickness and contain 0·5 milligramme of radium element. They allow the hard β rays to be used. A one and a half hours' application is generally sufficient to destroy the wart, and if there are several warts close together, they get a certain amount of cross-fire, which makes the treatment still more efficient.

For single warts, glacial acetic acid, nitrate of silver and other caustics are used with good results; much depends upon the clinical conditions of a wart. Diathermy and electrolysis are also useful at times. *Verrucæ seniles*, although pathologically similar to ordinary warts, have a clinical appearance which is altered a good deal by their developing in the skin of the aged, and especially upon covered parts, as the chest and back. *Keratoses seniles* are to be distinguished from senile warts, as they develop on the exposed parts. It is important to distinguish between these conditions, as keratoses are precancerous conditions, whereas senile warts are generally considered not to give rise to malignant growths. Our authors, "A" and "B", differ in this matter. "A" states that *verrucæ seniles* are prone to become malignant and should be removed surgically for this reason. He suggests removing the condition with a curette and then stopping the bleeding by a styptic or mild caustic. However, our author "B" states that seborrhœic or senile warts never become malignant, and recommends painting with carbolic acid or applications of carbon dioxide snow.

Personally, I agree with author "B", and although I have frequently applied carbon dioxide snow to senile warts, since I gave a demonstration of the use of carbon dioxide and liquid air in 1908 I have never seen any patient whom I have treated by these methods develop malignant disease. However, some of these formations are more efficiently destroyed by electrolysis, diathermy or other means. I always consider the application of carbon dioxide snow to *keratoses seniles* and early rodent ulcers risky, as I have seen malignant disease develop in such cases.

Venereal warts are clinically different from ordinary warts, on account of the positions in which they develop, on the genitals in man and vulva in women, and also in the anal region. They are vascular and bleed freely. During the war a great number of men came under my care at the base hospital with these warts under the prepuce. I found radium of great value in these cases, but others had to be treated surgically. *Verruca necrogenica* are of tuberculous origin and do not come under the notice of this paper.

Plantar warts on the soles of the feet are often mistaken for corns, but on paring these formations their vascularity is noticeable and the flattening of the wart is apparent, due to the pressure upon the growth.

However, radiation, X rays or radium, can be well applied in both these conditions, and local treatment should be used as apparently suitable to the condition presenting.

Special precautions are necessary in applying radium to the soles of the feet, as only a slight reaction may cause a lot of trouble to persons who have to be on their feet a great deal, either standing or walking, especially heavy persons. I have known radium necrosis follow after two or three hours' application, when the β rays have been used too strongly. In such cases it may be advisable to excise the part, as otherwise the condition may give a lot of pain and take a long time to heal.

Patients liable to corns or warts should wear good woollen socks, as they allow of aeration of the parts, especially persons with hyperhidrosis of the skin of the feet.

In applying trichloracetic acid for the destruction of warts, the destroyed part should be cut away before further application of the acid is made.

Filiform and some digitate warts may be treated by silk ligature, and nitrate of silver or carbon dioxide may be applied after excising the warts. Internally I have used sulphate of magnesia in small repeated doses for numerous warts in children. But local remedies are more reliable.

Our authors, "A" and "B", do not extol either charming warts away or the removal of the mother wart with expectant disappearance of the daughter warts. However, the following case is interesting from the point of view of the disappearance of a growth without apparent direct treatment by radium.

The patient was very elderly and had a most extensive rodent ulceration of the face, extending from the skin in front of the right ear, down the right side of the face, involving the skin below the jaw and up to the skin in front of the left ear. This extensive ulceration was markedly rolled edged and the ulceration of the central portion of the growth was about 2·5 to 5·0 centimetres (one to two inches) in width. On the left side of the face there was also an independently placed epithelial growth, oval in shape, not ulcerated and about the size of a small mandarin orange cut in half.

The patient was treated by radium applicators, applied to the growth on the right side of the face and gradually worked round to the end of the ulcerated growth on the left side of the face. I am now speaking of over twenty years ago, when radium applicators were not so numerous as they are nowadays. It took fourteen days to carry out this treatment, and by that time the oval-shaped growth had dwindled considerably and it and the rest of the growth disappeared entirely without any further treatment. Of course, the γ rays had entered this growth from the applicators directly applied to the ulcerated surface.

Untoward After-Effects of Radiation.

The result of a long application of γ rays, as in this case, suggests the necessity of considering what untoward after-effects may occur in normal tissues which are markedly radio-sensitive, even at a distance from the pathological condition being treated.

Dysfunction of the ureters, which are not markedly radio-sensitive, may occur after prolonged treatment of a malignant uterus by the γ rays of radium.

Dr. J. M. Buchanan has kindly contributed the following remarks in regard to this question:

> This result is brought about more by a marked scarring and contracture of the base of the parametria than by an actual cauterizing effect upon the ureters themselves.
>
> The anomaly therefore occurs at times of a patient having been cured of her malignant disease, but perishing later from uræmia. In these cases the ureters are gripped like a vice in the sclerosed parametric tissues. Double hydronephrosis is the rule in these cases.
>
> Careful search shows no trace of malignant deposit remaining in the pelvis. These cases are usually *carcinoma uteri*, Stages I and II, and as such are operable. It is questionable at present whether a method of treatment with possible fatal sequelæ, such as heavy radiation sclerosis, can be preferred to radical operation in competent hands when the rate of cure for Stages I and II is practically the same in both groups for radiation or operation. In Groups III and IV radiation is the only possible treatment.

I do not wish to open up this old question of radium or operation in the treatment of malignancy of the uterus. But when the results are compared, the results obtained by radical operation in competent hands should be compared with the radium results obtained under similar conditions.

However, the question of "unfortunate untoward after-effects" as regards treatment of radiations is a matter not even now thoroughly recognized.

In my paper on the removal of superfluous hairs recently published in The Medical Journal of Australia I drew

attention to the numerous untoward after-effects occurring in patients who had been treated by comparatively mild dosage of radiations. It is only reasonable to expect that heavy radiation treatment will likewise be followed by even more serious untoward after-effects. I recently had a patient who died from carcinoma developing in a keloid following an X ray examination. The interval between the burn and carcinoma development was twenty-five years.

My paper in The Medical Journal of Australia of April 28, 1923, on "Radiations upon the Metamorphosis of Insect Life", records experiments which suggest the importance of pre-operative radium therapy. This should help to make the operation safer as regards the operative procedure and lessen the risk of untoward after-effects.

In epithelioma of the lip, before needling the growth I apply radium externally and cross-fire where possible. I likewise give the lympho-glandular area (catchment area) a good protective radium treatment. The dosage administered is somewhat similar to the treatment applied to the larvæ of the *Bombyx mori*. Here the effect of the irradiation upon the larvæ is to prevent the metamorphosis of the insect. Instead of changing into the pupa stage and then into the moth stage, the grubs or larvæ remain in the same stage and many continue as grubs for as long as thirteen weeks before dying. Without the radiation treatment they would have matured to the moth stage, mated, laid eggs, with the future development of the species.

Under suitable radium treatment, therefore, it is reasonable to expect that the microscopic portions of the cancerous tissue displaced by the needling of the growth will be effected by the latent effects of the radiations and be prevented from developing in the parts to which they are carried in the lympho-glandular areas below the lower jaws (catchment areas) or even when carried away by the active circulation to other parts.

In the above-mentioned paper I described an inoperable case of malignant uterus treated by Dr. Cairns Lloyd and myself with radium in 1918. The radium dosage was of the order of 5,000 milligramme-hours, as calculated at that time. I do not suggest that the dosage applied in this case is a correct one according to our present knowledge of the subject, but it does suggest that there are many cases which may not require the very heavy radiations being applied by some surgeons at the present time. The patient, from seven stone, went up to eleven stone odd and was quite well when last heard of, about two years ago. There have not been any untoward after-effects in her case whatsoever.

Herman Lawrence, M.R.C.P. (Edin.),
Honorary Consulting Dermatologist, Saint Vincent's and Queen Victoria Hospitals, Melbourne.

British Medical Association News.

SCIENTIFIC.

A meeting of the Victorian Branch of the British Medical Association was held at the Melbourne Hospital on May 17, 1933. The meeting took the form of a series of clinical demonstrations by the members of the honorary staff.

Abscess of the Lung.

Dr. F. Blois Lawton showed a young man, aged eighteen years, who gave a history of having suffered from acute rheumatism at the age of twelve years. He was in bed at that time for a period of six weeks and was not properly well for one year afterwards; he suffered from endocarditis.

Six months before the meeting the patient suffered from: (i) A rheumatic throat; he was in bed for one month. (ii) Erythema on the buttocks and elbows for one week; this returned after an interval and was present for one month. (iii) Acute bronchitis and broncho-pneumonia; he was in bed for four weeks. There was a hacking cough with much sputum and on one occasion he coughed up two cupfuls of thick creamy material. He was very frail afterwards, but said that the cough disappeared. Although there was said to have been no cough, he had brought up sputum. On April 14, after playing baseball, he coughed up some blood mixed with phlegm. The blood was at first dark and then bright. The sputum was stained with blood for two or three days afterwards.

When seen a fortnight later he looked well, but his temperature was 37·3° C. (99·2° F.) and pulse rate was 90. His weight was 63 kilograms (10 stone); this was his best weight. His heart was not enlarged, and there was a systolic murmur heard best at the apex. His lungs showed no definite abnormal signs at the apices, but below the angle of the right scapula there was an area where there was some loss of resonance on percussion with diminished vesicular murmur and a few crepitations.

At X ray examination lateral views and postero-anterior films of the thorax were taken. Examination of the films showed the only pathological changes as consisting in fairly gross thickening and irregularity of the proximal portions of the main broncho-vascular branches of the right middle and right lower lobes. In both the right lateral and long-distance films there was an area in the perihilar region of the right lower lobe suggesting a residual cavity which might have resulted from an evacuated lung abscess formed as part of a broncho-pneumonic process. More peripherally along the same branch, and also at a higher level in this lobe, as well as in the middle lobe, the appearance suggested some bronchiectatic formation. Slighter similar changes were to be seen in the left lobe. No definite parenchymatous lesions were seen in either lung field. A single chin-nose film of the nasal accessory sinuses revealed a moderate degree of mucosal thickening in the right maxillary antrum and slighter similar changes in the left.

Septicæmia due to Bacillus Enteritidis (Gärtner).

Dr. Lawton also showed a man, aged thirty-two years, a shearer, who had suffered from a septicæmia due to *Bacillus enteritidis* (Gärtner). The patient was admitted to hospital on January 30, 1933. Onset of the illness occurred three weeks before admisison to hospital with severe epigastric pain accompanied by vomiting. The pain decreased for a time and then became more severe and more constant. There were rigors once or twice daily. No jaundice occurred. There was considerable loss of weight.

On his admission to hospital the patient's temperature was 38·9° C. (102° F.), his pulse rate was 104 and respirations numbered 22 in the minute. The patient was emaciated and looked very ill. There was rigidity in the epigastrium extending into both hypochondria with tenderness and fullness in the same area. The percussion note was dull almost to the level of the umbilicus. The diagnosis made at that time was a suppurating hydatid or a leaking duodenal ulcer.

At operation on February 3 the liver, pancreas and spleen were all found to be enlarged. There was subacute pancreatitis. The gall-bladder was drained. After operation the patient remained very ill and continued running a high temperature with daily remissions. There was diarrhœa for a few days.

On February 20 the lower part of the abdominal wound broke down and pus was discharged freely, and the discharge continued until the end of April. Numerous investigations were made and little useful information was obtained until February 21, when the patient's serum agglutinated *Bacillus enteritidis* to a titre of 1-300. Later, the *Bacillus enteritidis* was obtained in blood cultures on three occasions. Agglutination tests gave agglutination to a titre of one in 1280.

Until the second week in April the patient was extremely ill and for several weeks he seemed unlikely to recover. At that time there was evidence of improvement and the temperature fell gradually, becoming normal on April 21. Improvement then became fairly rapid and weight was quickly gained.

On March 20 an abscess was found in the anal region and the pus evacuated from this grew the *Bacillus enteri-*

tidis, which gave the same serological reactions as the bacillus isolated from the blood.

During convalescence cystitis occurred and the temperature was raised a little for one week. From the urine the *Bacillus enteritidis* was also isolated. There was no evidence of endocarditis.

The spleen was enlarged throughout the febrile period, and on April 10 there was pain over the splenic area and friction was palpable and audible over the spleen.

Fibroma of the Pleura.

DR. BASIL KILVINGTON showed a male patient, aged twenty-five, who gave a history of some lassitude for two years. Five months ago he coughed up some bright red frothy sputum after a severe bump at football. Shortly afterwards he noticed that the left side of the chest was more prominent than the right. For two months he had a cough with some viscid sputum.

On examination he had marked dulness to the left of the sternum extending to the axillary border and from the clavicle above almost to the diaphragm below. The left upper side of the chest wall bulged, and over the anterior border of the left lung there was dulness and very diminished breath sounds. X ray examination revealed a uniform hazy shadow except at the base in the antero-posterior view. A lateral picture showed that this shadow had an oval outline behind, well marked off from healthy looking lung shadow posteriorly. Both the Wassermann and Casoni tests gave no reaction, and the general health was excellent.

At operation under intratracheally administered ether a large curved incision was made over the inner ends of the second to sixth ribs. When part of the ribs was removed, a dense fibrous mass was met with and the pleura was freely opened by turning the third to the sixth ribs outwards from the sternal ends. The fibrous mass, which subsequently was found to weigh 1·35 kilograms (three pounds), was delivered through the opening with difficulty after being divided into three pieces. It was adherent to the pericardium and the large vessels, especially the innominate vein, but not densely. The only troublesome bleeding came from the internal mammary artery, which had to be tied. The positive inflation of the lung did not expand the organ to more than half its extent (as it had doubtless been compressed for years). The chest was closed. Fluid accumulated several times and required aspiration, and finally became mildly infected, necessitating drainage at the back by removing a small piece of the ninth rib in the posterior axillary line. The case then took the course of an empyema and gradually the lung completely expanded, assisted by some collapse of the chest wall where the ribs had been deflected. A microscopic examination showed the tumor to be a pure fibroma.

Fracture of the Neck of the Femur.

Dr. Kilvington's second patient was a woman, sixty-eight years of age, who had fractured the neck of her femur by tripping over a piece of carpet. She was unable to rise after this, and the leg was rotated outward, with some swelling at the hip region and 18 millimetres (three-quarters of an inch) of shortening. X ray examination showed the break to be high up in the neck with no impaction. The operation of inserting a Smith Peterson peg was done on the third day in Ord's apparatus under gas anæsthesia. The patient could walk next day and was allowed up from the start, and to try short walks. When shown seven weeks later, she had no shortening or outward rotation and could walk without a stick and could stoop down and touch her toes. A skiagram showed that the bones were in good position and approximated by the peg.

Hydronephrosis.

Dr. Kilvington also demonstrated two cases of hydronephrosis.

The first was of the pelvic type of dilatation in a girl of fourteen. She had complained of pain in the left loin for five years, and she had occasionally noticed a lump in that loin which disappeared as the attack subsided. At times the urine was dirty, and she had been treated for a long time for pyelitis. The renal function tests gave satisfactory results, and a pyelogram showed a dilated pelvis, which held 50 cubic centimetres of sodium iodide without discomfort. Nephrectomy was performed, and the obstruction seemed to be at the junction of pelvis and ureter, probably of congenital origin. No trace of an aberrant renal vessel was seen.

The second case was that of a woman of fifty-two with a history of pain in the left side of the back for six months off and on. Three months before being seen she had an acute attack of left renal colic with vomiting, which lasted about twenty-four hours. For three months there had been frequency of micturition both in the day and night.

On examination there was slight tenderness in the left loin, but no tumour could be felt. The culture of the urine was sterile, but calcium oxalate crystals were found. X ray examination revealed a small calculus at the junction of the left pelvis and ureter. The blood urea on admission was 111 milligrammes in 100 cubic centimetres of blood. A pyelogram showed a well-marked hydronephrosis of the renal type. The dye test showed blue coming from the right ureter in five minutes, but none appeared from the left in twenty minutes. Owing to the poor renal function, a ureteric catheter was left in the left pelvis for four days for continuous drainage and the blood urea came down to 35 milligrammes.

Owing to the marked dilatation and poor dye function, the left kidney was removed without another pyelogram being done. Examination of the kidney disclosed the stone impacted at the upper end of the ureter, but the kidney dilatation had largely disappeared as the result of the continuous drainage. It appeared as if removal of the stone would have been sufficient without sacrificing the kidney.

Tumour Pressing on the Cauda Equina.

DR. B. T. ZWAR showed a married woman, aged thirty-five years, who was admitted to hospital on November 6, 1930, with the following history. About thirteen years ago she had attacks of very severe pain in the right calf, which disappeared after about six months. Four months ago she was seized with severe aching pain in the back of the right thigh; the pain radiated up to the sacrum and down the lateral aspect of the right calf into the toes. She vomited freely. Pain persisted, and next day she had constipation and retention of urine. All bladder and bowel sensation was lost and the leg became very weak. The pain passed and she was left with weakness, numbness and tingling in the right leg. She developed incontinence of both fæces and urine. The symptoms gradually disappeared, and after seven weeks the patient left hospital. She was then able to get about with some residual weakness and numbness, but no actual loss of sensation. The day before admission to hospital she was suddenly seized with similar severe pain in both legs. She vomited freely and had shivers and sweats. The pain made her roll about. She was only partially eased by morphine. The bowels were constipated for two days. Some precipitancy and nocturnal incontinence of urine had been present for months.

On examination of the spine, vague tenderness was found over the third and fourth lumbar spines. Tenderness was present over the coccyx and the last two sacral vertebræ. No deformity was present. In the right thigh and buttock general tenderness was present, more marked over the sciatic notch. The tenderness passed down into the back of the calf. There were 2·5 centimetres (one inch) of wasting of the calf; there were six millimetres (a quarter of an inch) of wasting of the thigh. The right buttock was wasted. The muscles were flabby and hypotonic. Abnormal mobility of joints was present. Loss of power was proportionate to the wasting.

The deep reflexes, the biceps and knee jerks were equal and active. The ankle reflexes were absent. The plantar reflex was flexor. Diminished sensation to pinprick and cotton wool was present over the distribution of the first, second, third and fourth sacral nerves on the right side; no loss was detected on the left side. There was weakness in the muscles supplied by these segments. There was loss of the anal reflex. X ray examination revealed sacralization on the right side of the fifth lumbar vertebra.

On cisternal puncture the cerebro-spinal fluid was under normal pressure. There was no increase in cells or globulin. With descending lipiodol a definite block was discovered opposite the body of the fourth lumbar vertebra. Lumbar puncture gave a dry tap associated with severe pain in the right leg.

The Wassermann test, the Casoni and the hydatid complement fixation tests gave no reaction.

A diagnosis of tumour was made.

At operation the spinal cord was exposed. Just proximal to the fourth lumbar vertebra a band of tissue was found lying across the dura and slightly constricting it. Caudal thereto the dura was slightly bulging and a firm swelling was palpable. A tumour the size of a small cherry pedunculated at its base was found pushing into the canal. It was apparently arising from an intervertebral disk between the fourth and fifth lumbar vertebræ. This was removed and two radium needles, each one milligramme, were implanted into the surrounding tissues of base (removed in seven days).

On February 7, 1931, the patient had very slight incontinence of urine. Sensation returned over the affected area about two to three weeks after operation. At the time of the meeting the patient was able to walk well.

Microscopic section (Dr. C. H. Mollison) of tumour removed suggests a chordoma.

On December 3, 1931, the patient reported by letter: "No pains in back or hip, a little pain in the right foot."

On May 17, 1933, the patient had complete control of bladder and rectum. There was no tingling of the legs, but occasionally in the toes. There was no wasting of the right calf. The muscles were not flabby. There was slight loss of power in the right leg. The reflexes were *in statu quo*. There was slight diminished sensation to pinprick and cotton wool over a small area of the back of the right leg.

Compression Fracture of Sixth and Seventh Dorsal Vertebræ.

Dr. Zwar also showed a male, aged thirty-four years, who came into contact with a current of 6,000 volts, causing him to fall about six feet on to his back shortly before admission to hospital on November 15, 1929.

On examination at the time of admission to hospital the patient was pale, shocked and sweating; the pulse was feeble. He complained of upper abdominal pain and tenderness over the upper thoracic vertebræ. He could not move the right leg. Some involuntary movements of the abdominal and leg muscles were present. There were no active movements in the right leg. The biceps jerks were equal. The left knee jerk was more hyperactive than the right. The plantar reflex was extensor on both sides. There was a zone of hyperæsthesia at the level of the costal margin. The patient could not micturate and had to be catheterized.

On November 16, 1929, the reflexes were *in statu quo*. There was difficulty in tactile discrimination (sharp and blunt) below the left knee. Sensation to light touch, joint and muscle sense, and sensation of pain were all present.

On November 18, 1929, there was a definite area of hyperæsthesia about the eighth to the ninth segment. The left leg was paralysed. X ray examination revealed a compression fracture of the sixth and seventh dorsal vertebræ, marked wedging and some backward displacement. There was displacement of the seventh dorsal vertebra and all below it a little to the right, with fractures through the lateral portions of the body of the seventh vertebra and also the laminæ.

On November 19, 1929, laminectomy was performed. The laminæ and spinous processes of the fourth, fifth, sixth and seventh thoracic vertebræ were removed, and the cord commenced to pulsate after removal of the fourth thoracic vertebra. An old blood clot was present, evidently inside and around the dura at the level of the sixth thoracic vertebra. The dura was not opened. A temporary brace, later replaced by a permanent brace, was at once applied.

On November 27, 1929, the reflexes were unaltered. There was involvement of the joint and muscle sense in the right leg. There was slight spino-thalamic involvement of the left leg.

On December 3, 1929, the patient was able to pass urine, partly reflexly and partly by voluntary control. The reflexes in the legs were hyperactive. Marked ankle clonus was present. There were some movements in the legs.

On December 11, 1929, some voluntary control over defæcation was noted. The patient was still improving; he was moving his legs more easily.

On December 22, 1929, he was still spastic. Epicritic sensation was poor in the right foot. The patient had quite fair movement.

On January 26, 1930, he was still spastic. Sensation was almost normal.

On May 28, 1930, the superficial abdominal reflexes were absent. The knee jerks and ankle jerks were hyperactive and equal. Ankle clonus was present. The plantar reflex was extensor on both sides. Sensation was normal. There was slight spasticity of the legs.

On May 25, 1932, hyperæsthesia up to about the fifth dorsal nerve was noted. Some weakness was present in the legs. The patient had difficulty in walking downhill. The condition of the central nervous system was unchanged.

On May 17, 1933, the central nervous system was still unchanged. The patient still had zones of hyperæsthesia and anæsthesia, but not a complete girdle. He could now stand on tiptoes, which he could not do twelve months before. He had been carrying on work (clerical) for the last two years.

Fracture-Dislocation of Lumbar Vertebræ, Fracture of the Clavicle and Fracture of the Femur.

Dr. Zwar's third patient was a male, aged thirty-nine years. A wall collapsed on him one hour before admission to hospital on July 13, 1931.

On examination at the time of admission he was a strongly built man lying in bed inertly on his back, moaning and complaining of inability to move his legs. He had respiratory distress and cyanosis above the level of the clavicle on the right side. He had a comminuted fracture of the right clavicle at the inner third, together with posterior dislocation.

X ray examination revealed fracture and dislocation. There were depressed fractures of the fourth and sixth ribs in the nipple line. There was an extensive comminuted fracture of the right femur extending 17·5 centimetres (seven inches) in the middle and lower thirds.

The patient was very tender in the right loin. There was no tenderness over the lower dorsal and lumbar spines. X ray examination revealed fracture of the left transverse process of the first to the fifth lumbar vertebræ and fracture of the right transverse process of the first lumbar vertebræ; also a lateral subluxation to the right of the third lumbar vertebral body on the fourth with slight angulation.

The patient was unable to micturate and was unable to move his legs.

On examination of the central nervous system all deep reflexes were absent. The plantar reflexes were not elicited. There was loss of sensation from above the knees downwards.

On July 21, 1931, all forms of sensation were definitely blunted from the knee downwards bilaterally. No deep reflexes were elicited. Movement below the knee was absent.

On July 27, 1931, two small bed-sores appeared on the buttock.

On August 29, 1931, there was no change in the nervous signs.

On September 12, 1931, the bed sores were extensive; they were improving, but one was very severe. If the bladder was very full the patient could expel some urine.

On October 8, 1931, the patient passed urine spontaneously.

On November 5, 1931, the bed sores were healed. (Owing to presence of bed sores it had been impossible to perform laminectomy earlier.) Laminectomy on the third, fourth and fifth lumbar vertebræ was performed with spinal decompression. The *cauda equina* was seen to be flattened out. Pressure on the *cauda equina* was relieved by operation.

On November 9, 1931, complete loss of sensation to pinprick and to heat and cold from the knees downward was noted.

On December 3, 1931, there was some improvement in movements of the legs, and some sensory improvement seemed to be present.

On December 5, 1931, the patient sat out of bed. He could not empty his bladder voluntarily.

On December 22, 1931, there was definite improvement in the sensory and motor paths. Pinprick was appreciated down to lower one-third of the legs. The patient could move them better than before the laminectomy was done.

On March 7, 1933, sensation in regard to heat, cold and pinprick was accurate over the whole of both legs, except for portion of the feet which was very dull and portion of feet and outer part of leg which was blunted (corresponding to the fourth and fifth lumbar and first and second sacral nerve segments). A small anæsthetic area was present around the anus. The area of anæsthesia was greater on the left foot. In regard to the motor function, no flexion nor extension was present in ankles and toes. In the knees extension was strong. Flexion was good (weaker in the left leg).

On May 15, 1933, the patient had sensation around the anus, but the nervous functions were otherwise unchanged. He could walk quite well with the aid of crutches. He had recovered control of the bladder and rectal functions. The reaction of degeneration was present in the muscles supplied by the peroneal and tibial nerves (the fourth lumbar and fifth sacral segments).

Bronchial Fistula.

Dr. T. E. L. Lambert showed a woman on whom a decortication of the left lung had been performed nine years ago. She had an empyema of sixteen years' standing, for which a thoracoplasty had been performed four years before her admission to hospital. This, however, had been unsuccessful. The lung, which had been completely collapsed, expanded fully, but a small discharging sinus persisted. Three years later attempts were made to close this with diathermy, and a further decortication was performed. Dr. Lambert pointed out that the patient had a small bronchial fistula, which caused her no disability. Breath sounds were present over the whole chest, and her general condition was excellent, though at the time of operation she was reported as obviously suffering from amyloid disease as the result of prolonged sepsis.

Injury to the Knee Joint.

Dr. Lambert's second patient was a man whose knee joint had been damaged by an explosion. The patella had been shattered and the tibial tuberosity blown off. The joint was cleaned, all tags of dead tissue were excised and the cavity was irrigated with 1% formalin in glycerine. The loose fragments of patella were removed and an attempt was made to reconstitute the patellar ligament from the surrounding fascia. When shown, eight months after operation, the patient was still wearing a walking caliper, but was walking well. His patella was freely movable, and he had some movement of his knee, which was gradually increasing in range.

Undescended Testis and Hypospadias.

The third patient was a boy who had been admitted for operation on an undescended testis. While in hospital he was found to have a mild degree of hypospadias with an extremely small urethral orifice. The testis was placed in the extraperitoneal tissues through an opening made in the external oblique muscle after the inferior epigastric vessels had been divided. When the patient recovered from this operation, a suprapubic cystotomy was performed and repair of the hypospadias was undertaken. Half an inch of the urethra was dissected out of the *corpus spongiosum*, and then sutured together in such a manner as to leave a normal urethral meatus. The *glans penis* was then sutured over it. Convalescence was uneventful, except for a slight hæmorrhage on the ninth day, and the patient had just been discharged from hospital with his suprapubic wound completely healed, and a normal urethral meatus which would admit a number 14 catheter.

Bilateral Inguinal Hernia.

The fourth patient was a man in whom a bilateral inguinal hernia had been repaired by the transperitoneal route. A right lower paramedian incision was made, and the hernial sac was closed from within the abdomen by a continuous catgut suture, which gathered up all the loose peritoneal folds in the neighbourhood. Appendicectomy was performed at the same time. There was at present no sign of bulging or weakness at either inguinal ring.

(To be continued.)

Post-Graduate Work.

POST-GRADUATE COURSE IN OPHTHALMOLOGY.

The New South Wales Permanent Post-Graduate Committee, in conjunction with the Ophthalmological Society of New South Wales, will hold a post-graduate course in ophthalmology in Sydney. The course will commence on Monday, November 6, 1933, and will extend over a period of two weeks; a third week will be optional. The course is particularly planned so as to give instruction in refraction to general practitioners, so that they may be able to carry out this work in their own practices. The third week is optional and will be devoted entirely to retinoscopy by those who feel that they require further practical work at the conclusion of the course. Dr. A. E. F. Chaffer has been appointed to act as supervisor of the course.

The fee for the course will be £3 3s. Exchange should be added and cheques should be made payable to the New South Wales Permanent Post-Graduate Committee. The number attending this course will be strictly limited to thirty (30), so that those intending to be present should, as soon as possible, register their names by letter with the Honorary Secretary, New South Wales Permanent Post-Graduate Committee, 225, Macquarie Street, Sydney.

The programme will be as follows:

Monday, November 6, 1933.

9.30 a.m.—Registration at Medical School.

10 a.m.—Lecture: "Applied Anatomy of the Eye", Dr. A. J. Canny, Lecturer in Physiology.

11 a.m.—Lecture: "Physiology of the Eye", Dr. A. J. Canny.

2.15 p.m.—Practical demonstration of apparatus and instruments and the method of using them in the examination of the normal eye and taking of visual acuity, Dr. Darcy Williams, at Sydney Hospital Eye Department.

Tuesday, November 7, 1933.

9.30 a.m.—Lecture, "Optical Considerations of the Normal Eye", Dr. N. M. Gregg, at Royal Prince Alfred Hospital.

11 a.m.—Lecture, "Abnormalities of Vision: Hypermetropia, Myopia, Astigmatism *et cetera*", Dr. N. M. Gregg, at Royal Prince Alfred Hospital.

2.15 p.m.—Practical demonstration of the use of the ophthalmoscope and retinoscope, Dr. N. M. Gregg, at Royal Prince Alfred Hospital. Practice at refraction.

Wednesday, November 8, 1933.

9.30 a.m.—Lecture, "Diseases of the Lids, Lachrymal Apparatus and Orbit", followed by demonstration of cases by Dr. C. K. Cohen, at Sydney Hospital Eye Department.

11 a.m.—Lecture, "Diseases of Conjunctiva and Cornea, including Trachoma", Dr. James Flynn, at Sydney Hospital Eye Department. Demonstration of cases.

2.15 p.m.—Spectacle fitting and adjusting, Sydney Hospital Eye Department.

Thursday, November 9, 1933.

10 a.m.—Lecture, "Diseases of the Sclera, Iris, Ciliary Body and Choroid", Dr. Waddy, at Royal Prince Alfred Hospital. Demonstration of cases.

2.15 p.m.—Out-patient attendance. Practice and demonstration of refractions.

Friday, November 10, 1933.

10 a.m.—Lecture, "Diseases of the Lens and Vitreous", Dr. R. B. North, at Sydney Hospital Eye Department. Demonstration of cases.

2 p.m.—Out-patient attendance. Practice and demonstration of refractions.

Monday, November 13, 1933.

10 a.m.—Lecture, "Glaucoma and Its Differential Diagnosis", Dr. Guy Pockley, at Saint Vincent's Hospital. Demonstration of cases.

2.15 p.m.—Out-patient attendance. Practice and demonstration in refractions.

Tuesday, November 14, 1933.

10 a.m.—Lecture, "Diseases of the Retina and Optic Nerve", Dr. A. T. Dunlop, at Sydney Hospital Eye Department. Demonstration of cases.

2.15 p.m.—Out-patient attendance. Practice and demonstration of refractions.

Wednesday, November 15, 1933.

10 a.m.—Lecture, "Squint and Its Treatment, including Paralytic Strabismus", Dr. Temple Smith, at Royal Alexandra Hospital for Children. Demonstration of cases.

Free afternoon.

Thursday, November 16, 1933.

10 a.m.—Lecture, "Eye Injuries and Sympathetic Ophthalmia", Dr. Colin Ross, at Royal Prince Alfred Hospital.

2.15 p.m.—Out-patient attendance. Practice and demonstration of refractions.

Friday, November 17, 1933.

10 a.m.—Lecture, "Ocular Manifestations of General Disease", Dr. E. A. Brearley, at Royal Prince Alfred Hospital.

2.15 p.m.—Out-patient attendance. Practice and demonstration of refractions.

Diary for the Month.

Oct. 17.—New South Wales Branch, B.M.A.: Ethics Committee.
Oct. 18.—Western Australian Branch, B.M.A.: Branch.
Oct. 18.—Victorian Branch, B.M.A.: Clinical Meeting.
Oct. 19.—New South Wales Branch, B.M.A.: Clinical Meeting.
Oct. 24.—New South Wales Branch, B.M.A.: Medical Politics Committee.
Oct. 25.—Victorian Branch, B.M.A.: Council.
Oct. 26.—South Australian Branch, B.M.A.: Branch.
Oct. 26.—New South Wales Branch, B.M.A.: Branch.
Oct. 27.—Queensland Branch, B.M.A.: Council.
Nov. 1.—Western Australian Branch, B.M.A.: Council.
Nov. 2.—South Australian Branch, B.M.A.: Council.
Nov. 3.—Queensland Branch, B.M.A.: Branch.
Nov. 6.—New South Wales Branch, B.M.A.: Organization and Science Committee.
Nov. 10.—Queensland Branch, B.M.A.: Council.
Nov. 14.—New South Wales Branch, B.M.A.: Executive and Finance Committee.

Medical Appointments Vacant, etc.

For announcements of medical appointments vacant, assistants, *locum tenentes* sought, etc., see "Advertiser", page xvi.

Children's Hospital (Incorporated), Perth, Western Australia: Junior Resident Medical Officers.

Parramatta District Hospital, Parramatta, New South Wales: Junior Resident Medical Officer.

Medical Appointments: Important Notice.

Medical practitioners are requested not to apply for any appointment referred to in the following table, without having first communicated with the Honorary Secretary of the Branch named in the first column, or with the Medical Secretary of the British Medical Association, Tavistock Square, London, W.C.1.

BRANCH.	APPOINTMENTS.
New South Wales: Honorary Secretary, 135, Macquarie Street, Sydney.	Australian Natives' Association. Ashfield and District United Friendly Societies' Dispensary. Balmain United Friendly Societies' Dispensary. Friendly Society Lodges at Casino. Leichhardt and Petersham United Friendly Societies' Dispensary. Manchester Unity Medical and Dispensing Institute, Oxford Street, Sydney. North Sydney Friendly Societies' Dispensary Limited. People's Prudential Assurance Company Limited. Phœnix Mutual Provident Society.
Victorian: Honorary Secretary, Medical Society Hall, East Melbourne.	All Institutes or Medical Dispensaries. Australian Prudential Association, Proprietary, Limited. Mutual National Provident Club. National Provident Association. Hospital or other appointments outside Victoria.
Queensland: Honorary Secretary, B.M.A. Building, Adelaide Street, Brisbane.	Brisbane Associated Friendly Societies' Medical Institute. Chillagoe Hospital. Members accepting LODGE appointments and those desiring to accept appointments to any COUNTRY HOSPITAL are advised, in their own interests, to submit a copy of their agreement to the Council before signing. Lower Burdekin District Hospital, Ayr.
South Australian: Secretary, 207, North Terrace, Adelaide.	Combined Friendly Societies, Clarendon and Kangarilla districts. All Lodge Appointments in South Australia. All Contract Practice Appointments in South Australia.
Western Australian: Honorary Secretary, 65, Saint George's Terrace, Perth.	All Contract Practice Appointments in Western Australia.
New Zealand (Wellington Division): Honorary Secretary, Wellington.	Friendly Society Lodges, Wellington, New Zealand.

Editorial Notices.

Manuscripts forwarded to the office of this journal cannot under any circumstances be returned. Original articles forwarded for publication are understood to be offered to The Medical Journal of Australia alone, unless the contrary be stated.

All communications should be addressed to "The Editor", The Medical Journal of Australia, The Printing House, Seamer Street, Glebe, New South Wales. (Telephones: MW 2651-2.)

Subscription Rates.—Medical students and others not receiving The Medical Journal of Australia in virtue of membership of the Branches of the British Medical Association in the Commonwealth can become subscribers to the journal by applying to the Manager or through the usual agents and booksellers. Subscriptions can commence at the beginning of any quarter and are renewable on December 31. The rates are £3 for Australia and £2 5s. abroad *per annum* payable in advance.